

Remark N° 1
Human and Social Environment
Baseline

AES Gener draws a veil over the influence of the PHAM project in this area. It should call on studies validated by a renowned academic institution to assess the number of jobs to be lost due to effects caused by the Project. Please specify the number of jobs that would cease to be available in sectors such as tourism, aggregates, commerce, transport, and other associated areas, broken down by sector.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term

mutually beneficial relationships between the project and its surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**.

CAL.05 Promoting entrepreneurship

The company has agreed to use its **Fundación Maitenes** foundation to set aside an **annual fund over a 10 year period starting in 2010**, to support local residents who formulate tourism development business plans for implementation in the area. These projects will be financed through funds open for competitive tenders; submissions will be evaluated on their own merit by a council of community representatives, which will select which projects will be funded.

The initiative to be implemented by the Fundación Maitenes may be linked to projects in progress run by public institutions and services in the district, related to the two lines of action that the foundation has agreed to support. This linkage may help to strengthen state-run initiatives and foster sustainability over the course of time for the actions supported by the foundation, during the period in which the program is active.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

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During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.01 Jobs in the District

Local labor availability is estimated based on figures from the Labor Brokerage and Information Office. This information will be made available to construction contractors so that they can preferentially hire local workers. According to information compiled at the Project Office in San José de Maipo, the project has registered a total of 980 potential project workers, of whom 390 are unemployed, broken down as follows:

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SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. In parallel, the study investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 2 Ethnographic Study

The Project Owner must present a serious and unbiased study addressing all social and economic productive activities undertaken in the Maipo Valley areas that would be directly or indirectly affected by the Project.

Thematic responses

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CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

CAL.02 Education

A goal of the Maitenes Foundation relates to education for children and young people against the backdrop of the natural environment (for more information on the goals and achievements of the Foundation, see Annex 26 of the EIS).

Gener firmly believes that contributions to the technical and vocational education and training of young people must keep sight of real employment possibilities. Therefore, as a first initiative it has earmarked resources for an education improvement project in the district, which will contribute to establishing education management for the restructuring of the school curriculum and professional technical capacity building, taking into account the features needed to boost local employability. Based on information and recommendations from this study, Gener, acting through the Maitenes Foundation, will undertake a Capacity Building for Employability Program fundamentally oriented towards those whose family, social, or economic situation has barred them from completing their education and training, or acquiring the skills needed in order to find work. **CAL.03 Sports and leisure areas**

In order to avoid the loss or modification of land usage patterns, changes in usage, or loss of income associated with potential reduction in perceptions of the value of the surrounding areas, in terms of the provision of leisure, tourism, education, and other related services, the Project has developed a suite of measures that aim to minimize its environmental impact, so as to preserve the features that lead to the high perception of value of the area among residents, visitors, and tourists. These measures include: installation of most works in underground settings, thus minimizing their visual impact; the preservation of ecological flow rates in rivers and streams; and revegetation and reforestation of affected areas.

Similarly, the Project has enacted a suite of further measures to minimize interference with traditional livestock industries, as well as tourism and mountain/river sports.

In this way, the Project has taken all steps necessary in order to mitigate impacts on the environment, which will allow the area to retain the characteristics that make it so attractive for open-air education, tourism, and leisure activities. This will allow the project to operate alongside existing activities conducted in this area.

A wide-ranging suite of monitoring activities will be implemented to verify the effectiveness of the environmental measures (for more information, see **Chapter 8 of the EIS**). In parallel, and in order to verify that the Project does not affect cultural land usage patterns, applicable indices will be included for monitoring under the Social Indicator Monitoring (SIM) program.

CAL.04 Fostering tourism in the area

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SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

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Remark N° 3
Impact on Residents

The Project Owner must provide the local community with concrete guarantees regarding employ opportunities to be made available for those who are out of work or looking for better jobs, backing up these guarantees with legally valid documentation.

Thematic responses

Specific response

The Project Owner is unable to provide guarantees of employability, given that:

1. hiring activities will be undertaken by the works contractors
2. the suitability of each applicant must be assessed by the corresponding contracting party, in accordance with its requirements

SOC Socio-Economic Impact

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SOC.01 Jobs in the District

Local labor availability is estimated based on figures from the Labor Brokerage and Information Office. This information will be made available to construction contractors so that they can preferentially hire local workers. According to information compiled at the Project Office in San José de Maipo, the project has registered a total of 980 potential project workers, of whom 390 are unemployed, broken down as follows:

Mine workers:	105
Carpenters, Builders, and Rebar Layers:	157
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Other, misc.:	139

The average project workforce during the construction phase (5 years) is estimated at 2000 persons, and during the Citizen Participation process the company has agreed to ensure that an average of at least 500 local persons will be on the payroll during the construction of the Project.

SOC.01.01 Requirements

In view of the characteristics and scale of the Project, personnel with specific qualifications will be required for the operation and maintenance of plant machinery and equipment, during the operations phase. Conversely, during the Project Construction Phase, it is projected that labor requirements will create jobs not only for mining workers, but also for machinery operators, drivers, and both skilled and unskilled construction personnel, the latter working mainly as day laborers and assistants.

The population of the Project's area of direct influence has been found to possess levels of training and specialization (occupation as defined under the CIU code) that shall permit them to access both skilled and unskilled work positions created by the Project.

Remark N° 4 Labor

The Project Owner should describe the types of position to be filled by local residents, indicating quality and quantity broken down by age, sex, type of qualifications, and job requirements. In particular, please specify the quantity and type of employment to be made available to young people in the area, and the quantity and type of employment to be made available to women heads of households.

In line with this breakdown, the Project Owner should also specify the start date and exact duration of employment to be provided.

Thematic responses

SOC Socio-Economic Impact

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SOC.01.02 Working conditions

To date no schedule exists specifying labor requirements for the full duration of the construction phase. Detailed information specifying jobs created under average and peak labor requirements, broken down by labor requirement dynamics for each encampment, will only be available once the Project Owner has tendered the works contracts.

During the operations phase, it is expected that personnel requirements will amount to approximately 80 positions available, required for power plant operations and maintenance activities. Unlike work positions created during the construction phase, the jobs created in the operations phase will be permanent (EIS, Chapter 6, Section 6.4.2.4).

The Project Owner will provide for coordination between the construction works contractors, the Labor Brokerage Office, and the Municipality of San José de Maipo, regarding local labor required and jobs sought. The PHAM has accepted a commitment to incentivize works contractors to prioritize local contracting of labor required.

No prior training is planned in advance of the Construction Phase. However, such training will form part of the programs implemented in the more advanced phases of the project.

Remark N° 5 Impact on Production Activities and Users of Sanitary Services

Imbalance in the sedimentological dynamics of the Maipo River caused by the Project brings about a risk affecting a wide range of production activities and users in the Metropolitan Region, such as: sand producers, irrigation users, the Ministry of Public Works, and the company Aguas Andinas.

Thematic responses

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López and Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.03 Maipo River Sand Production

With regard to the extraction of aggregates in the Maipo River, during the operations phase of the PHAM, the Project will not modify current natural sediment (aggregates) transport dynamics occurring in the river.

In effect, under the natural dynamics, sediment transport takes place mainly in the months of November, December, and January, as a result of snow and ice melt in the high mountains, and it is during this season that variations in

flow rate in the Maipo River caused by the project stand at their lowest levels. The same behavior applies to winter season rises in river level.

It must be pointed out that the PHAM returns water to the Maipo River in the Las Lajas area, located upstream of the El Canelo zone, and therefore downstream of this point the river's flow dynamics with the project shall be identical to those currently observed.

It is of great importance to observe that currently, without the PHAM in operation, slightly downstream of the Las Vertientes area (in the La Obra stretch of the river), during certain times of the year flow rate in the Maipo River watercourse drops significantly, leaving the river bed dry, due to water abstraction at the following intakes: La Sirena Channel, San Carlos Channel, Independent Intake owned by Aguas Andinas, etc.

Average water abstraction flow rates attributable to the main drinking water and irrigation intakes, many of which also make use of hydroelectric power as a byproduct, but discounting the effects of existing hydroelectric plants on these channels that discharge directly into the intakes, amounts to 113 m³/second, which is equal to the average annual flow rate in the Maipo River at Las Vertientes. Depending on water availability, the annual

abstraction rate at these intakes varies between 78 and 164 m³/second.
This situation clearly explains the high level of perturbation observed in the behavior

of the Maipo River watercourse downstream of Las Vertientes, where the riverbed is dry except during periods of increased water level and in unusually wet years.

It is for this reason that the Project Owner asserts that its activities will have no impact on the current situation in the sand extraction sites located on the Maipo River.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service.

Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. The study also investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 6 Impact on Production Activities: Tourism

The Project is designed to minimize impact on tourism infrastructure, with point classifications and in relation with highway-related issues. This activity's real-world contribution to the District must be identified, along with the way in which it will be affected by reductions in flow rates, damage to ecosystems, access to mountain areas, impact on the landscape from power transmission lines.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally

complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's

high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plant (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **ELE Electrical Installations**

The electrical installations presented in the EIS comprise the substation, to be located in the El Sauce area, the characteristics of which are to be found in **Annex 27 of the EIS**; given that the electricity transport layout (cabling and towers) is to be presented to the Environmental Impact Assessment System once all background information is available.

ELE.03 Transmission lines

In view of the project's location, close to Santiago, it is expected that the distance covered by the definitive cabling layout will be short, involving a minimum of sectors not subject to prior intervention. With regard to the specific location of the cabling layout, plans call for the use of the existing high tension power line used by the Queltehues, Volcán, and Maitenes Plants.

Once the layout of the high tension power line has been defined, the Project Owner will submit this plan to the Environmental Impact Assessment System, in accordance with legislation in force. In line with the development of the Compliance Plan for environmental legislation applicable to the Project, the General Regulations applicable in this instance are indicated below:

Decree with Force of Law N°4, dated 05 February, 2007, setting forth the Recast, Coordinated, and Systematized Text of the General Law on Electrical Services.

The General Law on Electrical Services governs the generation, transmission, distribution, and regimen of concessions and tariffs applicable to electrical energy, and the functions of the State with regard to these areas.

Supreme Decree N° 327, Regulations Regarding the General Law on Electrical Services

The Regulations Regarding the General Law on Electrical Services establish, in their 8th Article, that hydroelectric power plants, electrical substations, and transmission lines may be installed without making a request for a concession, when the interested party wishes. These concessions may be provisional (in order to study projects) or definitive. A definitive concession is granted by a supreme decree issued by the Ministry of the Economy, by order of the President of the Republic. Permits relating to electrical installations that do not require concessions are granted by the corresponding Municipal Governments.

For further information and analysis on the aforementioned regulations, with regard to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see **Sections 3.1.6 and 3.1.7 of Chapter 3 of the EIS**, where more detailed versions of this information can be found.

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3**, and **Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neopteris curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Liolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed

will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor.

(see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

TUR Tourism

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.01 River sports

During the operations phase, the activities of the PHAM shall not directly or indirectly interfere with tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. Furthermore, the PHAM shall have no significant effect on boating activities on the Maipo River as a result of reductions in river flow rate; an analysis is presented in Annex 17 of the Addendum modeling a number of hydrological scenarios (1), concluding that the PHAM shall not affect the current situation in rafting and kayaking activities conducted in the area between San Gabriel and San José de Maipo.

In order to establish an analysis comparing the current Maipo River boating situation with predictions for the situation with the Project operational, the variables of flow rate, river width, and water depth were modeled, as valid indices to establish conditions for boating activities on the Maipo River.

This analysis showed that the Project shall not interfere with tourism activities conducted on the Maipo River, in view of estimates that in a dry year, the magnitude of variations in flow rate and water depth will not cause interference with boating activities.

For more information, see **Annex 17 of Addendum 1**.

- (1) The hydrological analysis used to evaluate reductions in flow rate is based on a statistical record going back 50 years, thus ensuring that seasonal and annual variations are incorporated into the analyses conducted.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector.

This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

TUR.03 Visual impact

The Project Owner has conducted a study to characterize the landscape of the area in which

the Project is to be located, taking into account esthetic and perceptual considerations and emphasizing the characterization and appraisal of the issues of visibility, quality, and visual fragility of the landscape.

In terms of Landscape Alteration or Landscape Impact associated with this infrastructure project, potential effects are classified as either limited duration - generally applying during the construction phase - or permanent, for effects that shall persist during the operations phase and continue throughout the working life of the Project. A qualitative methodology is used to study these effects, whereby the first phase consists of identifying sources of visual impact, and the second phase relates to identifying and classifying environmental impacts.

As a general rule, it is assumed that impact on the landscape during the construction phase shall be temporary, mainly due to the transitory nature of the sources of impact, the low level of prior human activity in certain areas, and the relatively low level of physical and visual accessibility of a significant proportion of the area subject to intervention.

As most of the Project construction works will be situated underground, during the operations phase the main visual signatures of its existence will be the intakes and access roads.

For further information on the methodology used for landscape impact assessment, see **Chapter 6, Section 6.1.4.10 of the EIS, and Annex 17 of Addendum 1.**

Remark N° 7

Impact on Production Activities: Tourism

What plans exist for the mitigation of the impact that the Project shall cause for tourists during the operations phase, through increases in journey times or increased waiting periods at intersections? The project owner should calculate the percentage of Santiago residents who regularly visit the Maipo Valley and who shall stop visiting as a result of annoyances caused by the Project.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents.**

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19.**

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1.** The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS.**

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayes, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions.

The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS.**

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in

these areas, demonstrating that no interference will arise, due mainly

to the following factors:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

VIA.03 Congestion

When PHAM Project construction activities begin, there will be an increase in road traffic movements in the immediate surroundings of the work area. This vehicle movement will be related mainly to the transport of supplies and machinery to the works installations, transport of excavation spoil to muck deposition sites, and, to a lesser extent, the transport of personnel to the work sites. For more information on traffic flow increases resulting from the Project, see **Chapter 2, section 2.4.1, part E, Annex 14 of the EIS, and Annexes 9 and 14 of Addendum 1.**

The PHAM highway impact analysis takes into account all works and activities under the Project, including the transport of supplies, machinery, and personnel. According to modeling studies, it is predicted that there will be no significant impact on highway usage (levels of saturation of new and existing roads and intersections). For more information on the Project's road operations, measurements used and models derived, see **Annexes 9 and 15 of the Addendum.**

Additionally, increases in noise emissions are analyzed in **Section 6.4.1.2 of the EIS.**

Notwithstanding the above, it is assumed that, given that certain construction activities shall be conducted at the same times that other road users wish to make use of certain sections of specific roads, a certain level of annoyance may be caused, and for this reason the PHAM has adopted a number of control and mitigation measures, indicated in **Chapters 6 and 2 of the EIS** and in **Annex 14 of the EIS, as well as Annexes 9 and 17 of Addendum 1.**

It is considered likely that, in view of the predominance of the tourist industry in the local economy of the district of the Maipo Valley, a certain level of annoyance may be caused at certain points and at specific moments, mainly due to conflicts between PHAM road usage and the movements of visitors. As indicated in the EIS Baseline Study, this is an area where tourists come to enjoy walks and peace and quiet, on weekends and holidays. In particular, there are 2 specific tourism attractions located in the same areas as site installations: the El Yeso and the Alto Volcán area, where special measures shall be taken, as specified in **Chapter 6 of the Project EIS.**

Additionally, **Annex 32 of the EIS** specifies emergency procedures to be adopted in the event of transport accidents caused by project vehicles.

Remark N° 8 Mitigation, Restoration, and Compensation Measures

What concrete social benefits will AES Gener contribute to the local community, given that it shall make commercial use of the valley's water and landscape resources? Indicate direct benefits in the fields of health, housing, and education.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

CAL.02 Education

A goal of the Maitenes Foundation relates to education for children and young people against the backdrop of the natural environment (for more information on the goals and achievements of the Foundation, see Annex 26 of the EIS).

Gener firmly believes that contributions to the technical and vocational education and training of young people must keep sight of real employment possibilities. Therefore, as a first initiative it has earmarked resources for an education improvement project in the district, which will contribute to establishing education management for the restructuring of the school curriculum and professional technical capacity building, taking into account the features needed to boost local employability. Based on information and recommendations from this study, Gener, acting through the Maitenes Foundation, will undertake a Capacity Building for Employability Program fundamentally oriented towards those whose family, social, or economic situation has barred them from completing their education and training, or acquiring the skills needed in order to find work. **CAL.03 Sports and leisure areas**

In order to avoid the loss or modification of land usage patterns, changes in usage, or loss of income associated with potential reduction in perceptions of the value of the surrounding areas, in terms of the provision of leisure, tourism, education, and other related services, the Project has developed a suite of measures that aim to minimize its environmental impact, so as to preserve the features that lead to the high perception of value of the area among residents, visitors, and tourists. These measures include: installation of most works in underground settings, thus minimizing their visual impact; the preservation of ecological flow rates in rivers and streams; and revegetation and reforestation of affected areas.

Similarly, the Project has enacted a suite of further measures to minimize interference with traditional livestock industries, as well as tourism and mountain/river sports.

In this way, the Project has taken all steps necessary in order to mitigate impacts on the environment, which will allow the area to retain the characteristics that make it so attractive for open-air education, tourism, and leisure activities. This will allow the project to operate alongside existing activities conducted in this area.

A wide-ranging suite of monitoring activities will be implemented to verify the effectiveness of the environmental measures (for more information, see **Chapter 8 of the EIS**). In parallel, and in order to verify that the Project does not affect cultural land usage patterns, applicable indices will be included for monitoring under the Social Indicator Monitoring (SIM) program.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **CAL.05 Promoting entrepreneurship**

The company has agreed to use its **Fundación Maitenes** foundation to set aside an **annual fund over a 10 year period starting in 2010**, to support local residents who formulate tourism development business plans for implementation in the area. These projects will be financed through funds open for competitive tenders; submissions will be evaluated on their own merit by a council of community representatives, which will select which projects will be funded.

The initiative to be implemented by the Fundación Maitenes may be linked to projects in progress run by public institutions and services in the district, related to the two lines of action that the foundation has agreed to support. This linkage may help to strengthen state-run initiatives and foster sustainability over the course of time for the actions supported by the foundation, during the period in which the program is active.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

**SOC.01 Jobs in the
District**

Local labor availability is estimated based on figures from the Labor Brokerage and Information Office. This information will be made available to construction contractors so that they can preferentially hire local workers. According to information compiled at the Project Office in San José de Maipo, the project has registered a total of 980 potential project workers, of whom 390 are unemployed, broken down as follows:

Mine workers:	105
Carpenters, Builders, and Rebar Layers:	157
Heavy Machinery Operators:	131
Non-specialized day laborers:	39
Drivers:	87
Specialized technical personnel:	60
Welders:	26
Foremen and supervisors:	7
Graduate professionals:	20
Cleaning, security, and canteen workers:	120
Administrative personnel:	91
Other, misc.:	139

The average project workforce during the construction phase (5 years) is estimated at 2000 persons, and during the Citizen Participation process the company has agreed to ensure that an average of at least 500 local persons will be on the payroll during the construction of the Project.

Remark N° 9 Mitigation, Restoration, and Compensation Measures

The provision of a shameful and insufficient annual fund of US\$ 200,000 over a 10 year period starting in 2010, allocated through the Maitenes Foundation, does not resolve any of the Valley's social problems; and nor does it contribute to the mitigation of the company's immense historic debt to the district.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

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The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

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Positive impacts have also been identified:

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This commitment will apply only if the Alto Maipo Project is executed.

Remark N° 10 Environmental Monitoring

What is the objective of the Operations Phase Social Indicator Monitoring Program? In what way will it benefit the local community? Why will it be implemented for only 5 years, when the impact of the Project may continue for decades? What indicators will be used to measure the impact of the Project, if baseline information is insufficient in this regard? What institution will provide guarantees that this study is independent and serious?

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

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The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
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In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. Details are provided regarding the principal characteristics of

this program in **Chapter 8, Section 8.2.7 of the EIS**, and in **Annex 39 of the EIS**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

OTR Other

This section relates to certain special situations that could not be categorized, or that are linked to specific requests, disqualifications, or situations that feature a clear political component, against either the environmental authority or the Project Owner.

OTR.02 CONAMA

Remark N° 11
Upper Maipo Basin Area Usage Flow Rate

The company shall not benefit the development of services currently provided in the district (lodging, food, commerce, transport). The encampments and the contractor companies will contract services outside of the district.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

CAL.05 Promoting entrepreneurship

The company has agreed to use its **Fundación Maitenes** foundation to set aside an **annual fund over a 10 year period starting in 2010**, to support local residents who formulate tourism development business plans for implementation in the area. These projects will be financed through funds open for competitive tenders; submissions will be evaluated on their own merit by a council of community representatives, which will select which projects will be funded.

The initiative to be implemented by the Fundación Maitenes may be linked to projects in progress run by public institutions and services in the district, related to the two lines of action that the foundation has agreed to support. This linkage may help to strengthen state-run initiatives and foster sustainability over the course of time for the actions supported by the foundation, during the period in which the program is active.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.01 Jobs in the District

Local labor availability is estimated based on figures from the Labor Brokerage and Information Office. This information will be made available to construction contractors so that they can preferentially hire local workers. According to information compiled at the Project Office in San José de Maipo, the project has registered a total of 980 potential project workers, of whom 390 are unemployed, broken down as follows:

Mine workers:	105
Carpenters, Builders, and Rebar Layers:	157
Heavy Machinery Operators:	131
Non-specialized day laborers:	39
Drivers:	87
Specialized technical personnel:	60
Welders:	26
Foremen and supervisors:	7
Graduate professionals:	20
Cleaning, security, and canteen workers:	120
Administrative personnel:	91
Other, misc.:	139

The average project workforce during the construction phase (5 years) is estimated at 2000 persons, and during the Citizen Participation process the company has agreed to ensure that an average of at least 500 local persons will be on the payroll during the construction of the Project.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. In parallel, the study investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 12 1. Water Rights

The Project does not hold concessions for water rights at any abstraction point. A technical report exists, issued by the DGA, that concludes that it would not be possible to make available the water rights requested by Gener because there is no physical availability of water. How can a project of this nature be evaluated if it does not hold the required water rights? Will the Project attempt to take over water rights held by third parties?

Furthermore, a vast number of complaints have been lodged opposing these transfers of rights, in the Upper Maipo area and in the Colorado River, by private individuals, neighborhood groups, irrigation channel user associations, and the company Aguas Andinas.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS**.

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in **Chapter 2 of the EIS**.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

Remark N° 13 2. Baseline Study

Given that the project does not hold the water rights that it hopes to use, and that should such rights be granted, the flow rates conceded are as yet unknown, the baseline study is not valid because it is based on suppositions regarding flow rates.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of the power plants requires an

ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 14

3. Upper Maipo Basin Area Usage Flow Rate

The Project plans establish a total water abstraction rate in the Upper Maipo Basin area of 27 m³/s. It is not made clear from where this flow rate will be abstracted, given that the maximum statistical monthly average for flow rate in the Yeso River is approximately 11 m³/s. The question is: Does the project plan to make any intervention directly affecting the El Yeso Reservoir?.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.05 Drinking water supply

Construction works and/or activities involved in the project (roads, movement of materials, transport of different products, etc) shall have no effect or impact whatsoever on the quality or security/safety of water supply in the Maipo River system. During the construction phase, Project interventions affecting watercourses shall cause only temporary effects resulting from Earth moving during excavation and other construction activities. This intervention shall affect small areas over short time periods, as it shall last only during the period while these installations are under construction (see **Section 6.4.1.4 of the EIS and Section VII, Question 17, in the Addendum**).

During operations, the PHAM shall not affect the Laguna Negra-Lo Encañado and El Yeso

Reservoir system, which is managed by the company Aguas Andinas S.A, in its capacity as holder of the drinking water concession for Santiago; nor shall the Project affect the operational dynamics of the drinking water supply system. Therefore, the implementation of the PHAM does not imply any impact whatsoever on the supply of drinking water (see **Section I, responses 27 and 29, in the Addendum**).

Furthermore, the water abstracted by the Project shall be returned to the river 5 km upstream of the

Toma Independiente or Independent Intake, operated by the company Aguas Andinas S.A., which abstracts water for drinking water supply to the city of Santiago; therefore, the PHAM shall not affect normal operations of this system. The PHAM shall only affect the delivery point of water in the tributaries of the Maipo River; in other words, water that currently does not drain into the Maipo River shall not be incorporated into that river's total flow.

However, in the event that an incident may arise as a result of an accident during construction, such as accidental spillages or rock falls, the procedures described in the Contingency Plan shall be implemented, consisting of a suite of actions to solve associated problems. This plan is explained in detail in **Chapter 7 of the EIS, Section 7.2.5**.

AGU.05.01 Drinking water quality

The process of hydroelectric power generation does not affect the physical/chemical qualities of water. Additionally, the PHAM does not plan to implement regulation installations that retain sediment. Thirdly, downstream of the discharge point the natural river conditions are maintained with regard to flow rate and physical/chemical properties.

During the construction of installations to be located in watercourses, the free-flowing course of the river is maintained through the construction of diversions through pipes laid along the river course for such purposes, or through channels that divert all flow, allowing free water circulation with no effect whatsoever on quality (see **Section I, Question 28, in the Addendum**).

The Project owner shall not make use of the Lo Encañado Lake or water usage rights owned by Aguas Andinas S.A. for this Project, instead opting to forgo usage of these resources and to replace the role that would have been fulfilled by the Lo Encañado Lake with a forebay located on a widening of the Alfalfa II plant headworks, located in the Alto Aucayes area on the Colorado River Valley (for details, see **EIS 2.2.1**). The Lo Encañado area shall be assigned a status of controlled access area at all times: it shall not be subject to any intervention whatsoever.

The Project Owner has made available a Water Quality Monitoring Program, with specifications for application during both the construction and operations phases. This program espouses a commitment to verify the effectiveness of environmental control measures designed to minimize the effects of works construction activities during the construction phase.

For further information on the Monitoring Program, see **Sections 8.2 and 8.3** in **Chapter 8 of the EIS**.

Remark N° 15

4. Ecological Flow Rates and Baseline Studies

The Project establishes an ecological flow rate for the Colorado River at 0.6 m³/s. This flow rate is outside of the bounds stipulated in the DGA Manual of Regulations and Procedures, which specifies that the value must be 10% of average annual flow rate - in this case, 3.1 m³/s plus environmental demand.

Our studies indicate that downstream of the intakes, the Yeso River dries out, the La Engorda Stream dries out, the Colina Stream dries out, the Las Placas Stream dries out, the Morado Stream dries out, and the Colorado River is left with a minimal flow rate. The ecological flow rates defined at the exits of the intakes will soak into the ground and not flow along the watercourses in question to their points of confluence with more major rivers, leaving them dry.

Ecological flow rates are determined based on the Environment Law, Law 19,300 and respecting the rights of third parties.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4 in Chapter 2 of the EIS**.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17 of the Addendum**.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to

intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams. It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Q_e) approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	Rain gauge station		
	406,157		
	Stream gauge station		
	6,259,100		
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 16

5. Impact on Sediments and Aggregates

The Project documentation itself states, in Annex 20, that potential aggregates production in the river basin will decline by around 3 million tons per year, which equates to more than 22% of total. This will affect the infrastructure of intakes, bridges, and water abstraction works, as well as the specific activity of aggregates extraction. If the authority has imposed a freeze on aggregates extraction permits in the first section of the Maipo River, how can it grant permission for a project that will extract 22% of all aggregates produced in the river basin?

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

riders and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum.**

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (**AGU.06.01**), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence. Watercourse degradation problems and effects on certain

highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted..

It can be concluded that the Maipo River system can be managed such that, With the Project operational , present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them.

Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

AGU.06.03 Maipo River Sand Production

With regard to the extraction of aggregates in the Maipo River, during the operations phase of the PHAM, the Project will not modify current natural sediment (aggregates) transport dynamics occurring in the river.

In effect, under the natural dynamics, sediment transport takes place mainly in the months of November, December, and January, as a result of snow and ice melt in the high mountains, and it is during this season that variations in

flow rate in the Maipo River caused by the project stand at their lowest levels. The same behavior applies to winter season rises in river level.

It must be pointed out that the PHAM returns water to the Maipo River in the Las Lajas area, located upstream of the El Canelo zone, and therefore downstream of this point the river's flow dynamics with the project shall be identical to those currently observed.

It is of great importance to observe that currently, without the PHAM in operation, slightly downstream of the Las Vertientes area (in the La Obra stretch of the river), during certain times of the year flow rate in the Maipo River watercourse drops significantly, leaving the river bed dry, due to water abstraction at the following intakes: La Sirena Channel, San Carlos Channel, Independent Intake owned by Aguas Andinas, etc.

Average water abstraction flow rates attributable to the main drinking water and irrigation intakes, many of which also make use of hydroelectric power as a byproduct, but discounting the effects of existing hydroelectric plants on these channels that discharge directly into the intakes, amounts to 113 m³/second, which is equal to the average annual flow rate in the Maipo River at Las Vertientes. Depending on water availability, the annual abstraction rate at these intakes varies between 78 and 164 m³/second.

This situation clearly explains the high level of perturbation observed in the behavior of the Maipo River watercourse downstream of Las Vertientes, where the riverbed is dry except during periods of increased water level and in unusually wet years.

It is for this reason that the Project Owner asserts that its activities will have no impact on the current situation in the sand extraction sites located on the Maipo River.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. The study also investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 17

5. Real Available Water Resources

Baseline studies to define ecological flow rates, taking into account the geology, local soil studies, and impact on flora and fauna, would certainly arrive at much lower figures for real available water resources than those presented. How much energy will this project really be able to generate?

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS**.

This section presents information characterizing the basins and tributaries of the Volcán, Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex

13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS**.

AGU.03.02 Geology

The baseline studies used in determining the geological characteristics of the Project area are presented in **Section 5.3.6 of the EIS**. Additionally, the **hydro-geological baseline studies** for the Project area are presented in **Section 5.3.5.3 of the EIS**. Complementary information is also provided in **Annex 45 of the EIS**.

Both of these studies start with general background information on the area where the Project is to be installed, going on to present a detailed description of the geological and geomorphological characteristics of specific areas where Project works or activities are planned.

Complementary information is provided in **Annex 8 of the Addendum**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to

intervention by means of a systematic characterization of the watercourses,

centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles,

70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempeo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neoporteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Lilolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result,

populations of organisms consist mainly of introduced species (EIS 5.4.3).. For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

Remark N° 18

7. Impact on aquatic flora and fauna

The Project fails to identify the species that shall be affected by flow reductions in the El Volcán area sub-basin, and similarly fails to identify the conservation status and water and water-flow requirements of species identified.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS**.

This section presents information characterizing the basins and tributaries of the Volcán, Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex

13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS**.

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles,

70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed

frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of

installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neopterteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo Spinolosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Lilolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

Remark N° 19

8. Impacts on Meadows and Wetlands

The Project does not mention impacts that it will incur through the reduction of flow rates in water bodies, in high altitude wetlands and meadows located within the Project's area of influence. It should be borne in mind that as a consequence of the construction of the Alfalfal I Plant, which became operational in 1991, a number of meadows/wetlands dried out.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate

that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth,

flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

SUE.02 Soils, meadows, and wetlands

The Project Owner has conducted a number of studies with the aim of characterizing the vegetation of summer grazing areas (La Engorda) (see details in Addendum 1, Annex 6, and in Chapter 5 of the EIS), as well as flora and vegetation studies in the Project's area of influence (EIS, Chapter 5).

These studies contain information compiled in fieldwork campaigns conducted in Fall 2005, Spring 2006, November 2007, March 15 and 16, 2008, and September 2008, which add to the body of knowledge available regarding vegetation in these areas.

The Lo Encañado area shall be assigned a status of controlled access area for works contractors at all times: it shall not be subject to any intervention whatsoever. For more information on vegetation areas that could be affected by the construction works, and to learn about mitigation measures proposed by the Project Owner, you are advised to review Annex 42 of the EIS and Annex 6 of the Addendum.

With regard to environmental regulations that apply specifically to vegetation and plant life, the Project Owner shall be subject to:

Supreme Decree 366 (Exploitation of Tamarugo, Carob, Chañar, Guayacán, Aextoxicon, Charcoal, Acacia, Boldo, Maiten, Litre, Bollen, and Quillay). This legal instrument governs the felling of trees and bushes.

Supreme Decree 4363 and D.L 701 (Approving the Definitive Text of the Law on Woodland and Regulations on Forest Promotion).

Article 2 of the Woodland Law establishes an obligation that land classified as for preferential woodland land use, as well as natural and artificial woodlands, are subject to woodland management plans approved by the National Forestry Commission (CONAF). Furthermore, Article 21 of Decree Law 701 establishes that any felling or usage of native woodland shall be subject to the CONAF's prior approval of the corresponding management plan.

Decree 82 (Prohibiting the Felling of Trees and Bushes in Indicated Andean High Mountain and Foothill Areas)

Article 102 Sector Environmental Permit (Permit for the felling or exploitation of native woodland, in any type of land, or plantations located in land with preferential characteristics for woodland use).

For further information and analysis on the aforementioned regulations and permits, as applicable to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see Sections 3.2.6 and 3.3.7 in Chapter 3 of the EIS.

Remark N° 20

9. Sustainability in the Maipo River Basin

The Company does not hold the corresponding water rights, and the Baseline studies are therefore not valid.

The Project does not comply with the Environmental Impact Assessment System. The company does not recognize the impacts that shall arise as a result of the extraction of water resources.

The Project is not capable of generating 530 MW. Data studied indicate that the company does not possess the water resources necessary to operate the Project, and does not hold corresponding water rights.

The Gener PHAM Project is not compatible with the sustainability of the Maipo River Basin.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work.

For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

existing in the Project area.

This section presents information characterizing the basins and tributaries of the Volcán, Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex

13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not

commonly frequented, minimizing their visual impact.

Remark N° 21 Cultural Heritage

The Project shall affect sites of incalculable heritage value, and yet information is provided on only some of these sites, identified in the Baseline. Three areas are identified as featuring resources of cultural interest: Las Morrenas and Camino del Inka in the Lo Encañado Lake area, and the site known as Aucayes 1 in the Colorado River - Aucayes Stream area, as well as a site of paleontological interest as Alto Volcán.

What guarantees does the Project Owner provide to ensure that contractor companies respect this archeological and paleontological heritage? How many professionals will be tasked with providing training or monitoring of contractor companies? What legally-backed institution will monitor works and determine the significance of sites and remains discovered?

What institution will provide oversight in order to ensure legal minimal compliance? Contractual requirements affecting contractor companies are not sufficient.

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

AGU.01 Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum 1**.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material
- b) creation of a viewpoint
- c) fossil trail

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

Remark N° 22 Definition of Baseline 1

Where plans call for the construction of roads, intakes, muck disposal heaps, temporary encampments, and other such sites, the company fails to recognize the existence of a site of immense paleontological value that is unique in Chile: 150 million year old dinosaur footprints. Under the protection granted under current legislation, this area should be protected and no commercial project that would affect it should be conducted. No information is available on such ichnofossils of this age in Chile, so studying them could yield a major contribution to Chilean and global paleontology. Law 17,288 Title I - Art. I and Title III Art. 10-12-13.

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

AGU.01 Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum 1**.

ARQ.02 Values preservation

General paleontological protection measures:

i) **Restricted area applicable to contractor company employees**

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) **Delimitation of buffer zones**

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) **Contingency measures**

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) **Compensation measures**

- production of cultural information material**
- creation of a viewpoint**
- fossil trail**

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be

implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

Remark N° 23 Definition of Baseline 2

The Project documentation omits information on the existence of geological structures that are unique in Chile and that are of incalculable value, which currently constitute an "open air museum" and that could be subject to irreparable damage through the construction of the PHAM. These formations include a number of types of mudcrack and raindrop structures with ages between 155 and 150 million years. A detailed survey should be conducted to document these features, and the area should then be given protected status due to the scientific value of these structures, which are unique in Chile.

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

AGU.01 Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum**.

ARQ.02 Values preservation

General paleontological protection measures:

i) **Restricted area applicable to contractor company employees**

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) **Delimitation of buffer zones**

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) **Contingency measures**

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) **Compensation measures**

- a) **production of cultural information material**
- b) **creation of a viewpoint**
- c) **fossil trail**

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

ARQ.03 Scientific research

The scientific and cultural importance of the paleontological resources present has been recognized by the PHAM Project Owner, leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the Project Owner has taken on a commitment to enhance knowledge of the area before starting planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may be detected during the course of construction under the PHAM. These activities will contribute not only to the

maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of materials or components present.

For more information, see **Annex 14** of **Addendum 1**.

Remark N° 24
Cultural Heritage
Regarding Law 17,288

The law establishes that FOSSILS AND THE SITES WHERE THEY ARE LOCATED ARE A NATIONAL MONUMENT without specifying differences between paleontological pieces depending on their importance to science. In this regard, there is a need to identify how criteria will be established for the classification of pieces according to their scientific significance, the institutions or persons who shall act as guarantors, and the legal backing for conducting surveys of the quality described - as these are actions that infringe legislations in force. Law 17,288 Title V Art. 21-22-23.

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

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be detected during the course of construction under the PHAM. These activities will contribute not only to the maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of materials or components present.

For more information, see **Annex 14 of Addendum 1**.

Remark N° 25

Measures for the Protection or Preservation of Paleontological Heritage Existing in the Project's Area of Influence

Interventions at fossil sites implies the loss of material that no **known mitigation measure can resolve**. The extraction of a part of the material that is visible causes the loss of many other parts that remain covered. The removal of pieces and their deposition in other areas takes them out of their original context and leaves them stripped of all scientific value. In this regard, the Project Owner must specify what measures it shall implement if it does not possess permits issued by the National Monuments Council, for how long it shall support these measures, and what institution(s) will vouch for them.

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

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ARQ.03 Scientific research

The scientific and cultural importance of the paleontological resources present has been recognized by the PHAM Project Owner, leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the Project Owner has taken on a commitment to enhance knowledge of the area before starting planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may

be detected during the course of construction under the PHAM. These activities will contribute not only to the maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of materials or components present.

For more information, see **Annex 14** of **Addendum 1**.

Remark N° 26 Water Rights

The Project does not hold concessions for water rights at any abstraction point. A technical report exists, issued by the DGA, that concludes that it would not be possible to make available the water rights requested by Gener because there is no physical availability of water. How can a project of this nature be evaluated if it does not hold the required water rights? Will the Project attempt to take over water rights held by third parties?

Furthermore, a vast number of complaints have been lodged opposing these transfers of rights, in the Upper Maipo area and in the Colorado River, by private individuals, neighborhood groups, irrigation channel user associations, and the company Aguas Andinas.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in **Chapter 2 of the EIS.**

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

Remark N° 27 Baseline Study

Given that the project does not hold the water rights that it hopes to use, and that should such rights be granted, the flow rates conceded are as yet unknown, the baseline study is not valid because it is based on suppositions regarding flow rates.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS**.

This section presents information characterizing the basins and tributaries of the Volcán, Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This

characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex 13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS.**

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 28 Ecological Flow Rates and Baseline Studies

The Project establishes an ecological flow rate for the Colorado River at 0.6 m³/s. This flow rate is outside of the bounds stipulated in the DGA Manual of Regulations and Procedures, which specifies that the value must be 10% of average annual flow rate - in this case, 3.1 m³/s plus environmental demand.

Our studies indicate that downstream of the intakes, the Yeso River dries out, the La Engorda Stream dries out, the Colina Stream dries out, the Las Placas Stream dries out, the Morado Stream dries out, and the Colorado River is left with a minimal flow rate. The ecological flow rates defined at the exits of the intakes will soak into the ground and not flow along the watercourses in question to their points of confluence with more major rivers, leaving them dry.

Ecological flow rates are determined based on the Environment Law, Law 19,300 and respecting the rights of third parties.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4 in Chapter 2 of the EIS**.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17 of the Addendum**.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to

intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams. It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

AGU.04.04 Monitoring and control of flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Q_e) approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	Stream gauge station		
	406,157	6,259,100	
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 29

Impact on Sediments and Aggregates

The Project documentation itself states, in Annex 20, that potential aggregates production in the river basin will decline by around 3 million tons per year, which equates to more than 22% of total. This will affect the infrastructure of intakes, bridges, and water abstraction works, as well as the specific activity of aggregates extraction. If the authority has imposed a freeze on aggregates extraction permits in the first section of the Maipo River, how can it grant permission for a project that will extract 22% of all aggregates produced in the river basin?

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (**AGU.06.01**), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence. Watercourse degradation problems and effects on certain

highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted..

It can be concluded that the Maipo River system can be managed such that, With the Project operational , present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them.

Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

AGU.06.03 Maipo River Sand Production

With regard to the extraction of aggregates in the Maipo River, during the operations phase of the PHAM, the Project will not modify current natural sediment (aggregates) transport dynamics occurring in the river.

In effect, under the natural dynamics, sediment transport takes place mainly in the months of November, December, and January, as a result of snow and ice melt in the high mountains, and it is during this season that variations in

flow rate in the Maipo River caused by the project stand at their lowest levels. The same behavior applies to winter season rises in river level.

It must be pointed out that the PHAM returns water to the Maipo River in the Las Lajas area, located upstream of the El Canelo zone, and therefore downstream of this point the river's flow dynamics with the project shall be identical to those currently observed.

It is of great importance to observe that currently, without the PHAM in operation, slightly downstream of the Las Vertientes area (in the La Obra stretch of the river), during certain times of the year flow rate in the Maipo River watercourse drops significantly, leaving the river bed dry, due to water abstraction at the following intakes: La Sirena Channel, San Carlos Channel, Independent Intake owned by Aguas Andinas, etc.

Average water abstraction flow rates attributable to the main drinking water and irrigation intakes, many of which also make use of hydroelectric power as a byproduct, but discounting the effects of existing hydroelectric plants on these channels that discharge directly into the intakes, amounts to 113 m³/second, which is equal to the average annual flow rate in the Maipo River at Las Vertientes. Depending on water availability, the annual abstraction rate at these intakes varies between 78 and 164 m³/second.

This situation clearly explains the high level of perturbation observed in the behavior of the Maipo River watercourse downstream of Las Vertientes, where the riverbed is dry except during periods of increased water level and in unusually wet years.

It is for this reason that the Project Owner asserts that its activities will have no impact on the current situation in the sand extraction sites located on the Maipo River.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. The study also investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 30 Climate Change

The PHAM does not recognize or mention climate change or global warming. It is known that temperatures will rise, precipitation will diminish, and sea levels will rise. The Project Owner should take these variables into account in its study.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.04 Monitoring and control of flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Q_e) approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum.**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
Alto Volcán	Stream gauge station	406,157	6,259,100
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán)		
Alto Volcán	Control Station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control Station	406,780	6,260,782

Alto Volcán	Las Placas Intake Control Station Colina Intake	407,181	6,260,081
Alto Volcán	Control Station El Morado Intake	405,768	6,261,231

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Yeso River	Rain gauge station PBN (15)	391,504	6,262,449
Yeso River	Control Station El Yeso Intake	399,666	6,272,077
Colorado River	Stream gauge station El Sauce	380,449	6,287,261
Colorado River	Intake control station Colorado River	389,063	6,292,501

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 31
Cultural, Paleontological, and Natural
Heritage:
1.- Baseline

In point V.6 in the EIS, regarding cultural heritage, the existence of heritage resources within the Project's area of influence is recognized, stating that "three areas are identified as featuring resources of cultural interest: Las Morrenas and Camino del Inca in the Lo Encañado Lake area, and the site known as Aucayes I in the Colorado River - Aucayes Stream area (...). In the Alto Volcán area, sites have been detected that may contain very ancient fossils or paleontological material (...) PHAM works shall not generate any direct intervention".

Further on in the document, in Table 7 (Identification, prediction, and evaluation of environmental impacts and risk situations) it is recognized that the Project shall have a LOW-SIGNIFICANCE NEGATIVE IMPACT on these resources. It should be pointed out that the impact on heritage resources is NEGATIVE AND IRREVERSIBLE (implying their destruction) and therefore cannot be considered to be of low significance.

Furthermore, in TABLE 6, it is stated the Project SHALL NOT AFFECT CULTURAL HERITAGE SITES IDENTIFIED IN THE BASELINE.

Please clarify the contradictions between information provided by the Project Owner in the baseline and in tables 6 and 7: Will the Project have an impact on the area's archeological and paleontological resources, or will it not?.

Please indicate why no information was provided on the Inca site at Laguna del Indio. This site is located just a few meters from the Inca trail located 1.5 km from the Project, and consists of a collection of structures in a natural depression, immediately to the W of the Laguna del Indio (Yeso River). The site contains four main enclosures, separated by a central passageway, with each enclosure subdivided into smaller rooms. Several of these rooms show clear evidence of looting. (UTM 396,500 E 6,274,479 N) Elevation 2692 m. The site features a number of architectural features typical of Inca architecture (Late period, c. 1470 to 1535 CE). The site features typical construction techniques, with double walls filled in with small stones. The central passage features a precise E-W orientation, and the layout divides the site perfectly into four parts. The site is associated with the Inca Trail known as the Camino del Inca (see the publication *Nuevos Registros de Asentamiento Inca en la cordillera andina de Chile Central*. Luís E. Cornejo B., Miguel A. Saavedra v. & Héctor Vera C. 2006.).

Please clarify why no reference is made to the existence of published sites located near to the Project.

Thematic responses

ARQ Archeological and
Paleontological Sites:
Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

AGU.01
Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum**.

1.
ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest

(e.g. concentrations of

Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material
- b) creation of a viewpoint
- c) fossil trail

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

ARQ.03 Scientific research

The scientific and cultural importance of the paleontological resources present has been recognized by the PHAM Project Owner, leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the Project Owner has taken on a commitment to enhance knowledge of the area before starting planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may be detected during the course of construction under the PHAM. These activities will contribute not only to the maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of materials or components present.

For more information, see **Annex 14 of Addendum 1**.

Remark N° 32
Cultural, Paleontological, and Natural
Heritage:
2.- Environmental Monitoring Plan

Chapter 8 contains the Environmental Monitoring Plan, which will allow the monitoring of relevant environmental variables that have given rise to the content of the EIS. Here, the Project Owner states that *"The PHAM hereby submits to the SEIA that during execution of the Project certain effects, characteristics, or circumstances referred to in subsections b), d), e), and f) of Article 11 of Law 19,300 may arise or be caused, and that therefore the implementation of the Project shall include a suite of mitigation, compensation, or restoration measures that are suitable for offsetting these effects"*. Part f) of that Article refers to *"alteration of monuments, sites with anthropological, archeological, or historic value, and, in general, sites belonging to cultural heritage"*, including areas of paleontological interest.

Although heritage is specifically recognized as a relevant environmental variable, it is recognized that it will be affected by a negative impact, and the presence of a suitable professional is proposed, in order to undertake continual monitoring during the construction phase; nonetheless, the EIS does not contain plans to integrate this action into the environmental monitoring plan.

Clarify these contradictions.

Thematic responses

ARQ Archeological and
Paleontological Sites:
Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

AGU.01
Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum 1**.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material
- b) creation of a viewpoint
- c) fossil trail

For more information and details on the preservation of heritage value and

paleontological resources, please see **Annex 14 of Addendum 1**.

ARQ.03 Scientific research

The scientific and cultural importance of the paleontological resources present has been recognized by the PHAM Project Owner, leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the Project Owner has taken on a commitment to enhance knowledge of the area before starting planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may be detected during the course of construction under the PHAM. These activities will contribute not only to the maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of materials or components present.

For more information, see **Annex 14 of Addendum 1**.

Remark N° 33
Cultural, Paleontological, and Natural
Heritage:
3. Preventive measures

In order to protect heritage resources, the Project Owner plans to obtain "continual on-site expert advisory services to prevent or minimize impact" (table 7). At which work sites will archeological monitoring be implemented? This question should also be taken to include muck disposal sites, sites for the extraction of aggregates and sand, and works involving improving, widening, and maintaining roads.

Furthermore, we do not consider this measure to constitute a "risk and accident prevention measure", but that it should rather be included in the environmental monitoring plan, for the reasons expressed in the previous point.

Thematic responses

ARQ Archeological and
Paleontological Sites:
Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

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For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

AGU.01
Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
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- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum**.

1.

ARQ.02 Values preservation

General paleontological protection measures:

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This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

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The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

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In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

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- b) creation of a viewpoint
- c) fossil trail

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

ARQ.03 Scientific research

The scientific and cultural importance of the paleontological resources present has been recognized by the PHAM Project Owner, leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the Project Owner has taken

on a commitment to enhance knowledge of the area before starting

planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may be detected during the course of construction under the PHAM. These activities will contribute not only to the maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of materials or components present.

For more information, see **Annex 14** of **Addendum 1**.

Remark N° 34
Cultural, Paleontological, and Natural
Heritage:
4. Sites of Paleontological Interest

The Project Owner plans to conduct a complementary paleontological study in advance of construction, and to implement certain management measures to protect the resources currently registered with the SPACH, and other resources that may be discovered. In this regard, during the evaluation of the first EIS presented, which is currently under review, the CMN, which is the competent body in the field, has already issued a request for the preparation of a report that has yet to be produced.

When does the Project Owner plan to comply with this requirement? Specifically, what are the “management measures” that the Project Owner plans to implement to protect these resources?.

Thematic responses

ARQ Archeological and
Paleontological Sites:
Heritage

According to the results of archeological survey activities and background information compiled, the Project’s area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project’s area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

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For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

AGU.01 Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

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- Workforce training on the possible presence of archeological sites.
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ARQ.02 Values preservation

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In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project’s paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material**
- b) creation of a viewpoint**
- c) fossil trail**

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

ARQ.03 Scientific research

The scientific and cultural importance of the paleontological resources present has been recognized by the PHAM Project Owner, leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the Project Owner has taken

on a commitment to enhance knowledge of the area before starting

planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may be detected during the course of construction under the PHAM. These activities will contribute not only to the maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of materials or components present.

For more information, see **Annex 14** of **Addendum 1**.

Remark N° 35
Cultural, Paleontological, and Natural
Heritage:
5. Annex 43

This annex contains the minutes of a meeting held on January 3, 2008, and it is therefore not appropriate to cite it in the Project assessment currently under review. Furthermore, it is there stated that the issue of paleontological heritage is outside of the remit of the PAC and ICSARA (we assume that this refers to the EIS that was withdrawn), and yet the Project Owner states that "AES Gener thanks the SPACH for highlighting the scientific and cultural value of these bodies of evidence, which it recognizes and respects, and although they do not fall within the established procedure it shall include them as part of the citizen participation process". As stated in point 4 of this document, the CMN (the applicable competent body) has yet to issue a statement on the significance of these paleontological resources, and requested the preparation of a report complying with the items specified in the corresponding ordinance. The Project Owner has yet to respond to this requirement. Additionally, the minutes contained in Annex 43 also set forth a series of items agreed with the SPACH, including: "Based on these concepts, within the next two days the SPACH shall prepare a methodological proposal to form an agreement with AES Gener regarding the scope, by means of a joint agreement that includes the commitments made in the agenda." If this proposal must be submitted by January 5, why was it not included in the study currently under review? The following item states that: "All necessary permits shall be submitted for procedures conducted by the SPACH, and this body shall be directly involved in the procedures to be implemented." In this regard, the Project Owner is requested to indicate the name of the qualified paleontologist who shall be responsible for obtaining these permits.

The Project Owner is hereby informed that the permits granted by the CMN for intervention in this type of resource are personal in nature, and therefore cannot be requested by the SPACH. Requests made to the CMN must specify a number of points, including the professional responsible for the activity, work team, specialists who are to analyze materials, and methodology for excavation or recovery of finds, and analysis (see the regulations on Law 17,288, on persons authorized to conduct surveys and request permits to excavate and intervene affecting such resources). Finally, the Project Owner is hereby informed that excavation permits constitute a sector environmental permit, and as this permit is necessary, it should already be requested under the study presented in the plan for compliance with environmental legislation in force (Point 2 of the executive summary)

Thematic responses

ARQ Archeological and
Paleontological Sites:
Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

AGU.01
Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

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- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum**.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental

damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access

restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) **production of cultural information material**
- b) **creation of a viewpoint**
- c) **fossil trail**

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

Remark N° 36
Cultural, Paleontological, and Natural
Heritage:
6. The El Morado
Monument

CONAF, in Ordinance 30 dated February 5, 2008, and Ordinance 70 dated April 9, 2008, requested that the line taken by the tunnel be adjusted so as not to enter this protected area, as it considered that the Project Owner had been unable to guarantee that the construction and operation of the El Volcán Tunnel would not lead to impacts on the resources and processes that the area protects - in particular, geological and geomorphological processes and features, including the glacier and fossil-bearing strata; rather, the Project Owner was only able to express that the occurrence of problems or contingencies was of low likelihood.

The objective of the creation of this monument was "To preserve an ecosystem that is representative of the Upper Maipo Basin (Morales Stream) through the protection of its natural scenic beauty, its geological and geomorphological processes, and its endangered life-forms". The area's specific conservation objectives include "preservation of the geological and geomorphological processes and features present in the Area, including the glacier and fossil-bearing strata; protection of the Area's natural scenic beauty, including its glacier, vegetation, lake, streams, mineral waters, and fossil-bearing rock strata, and support of scientific research into its natural and cultural resources, permitting the enhancement of knowledge regarding the area".

Clarify these contradictions, and explain why the modification requested have not been implemented.

Thematic responses

ARQ Archeological and
Paleontological Sites:
Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

AGU.01
Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum 1**.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compe neasures

- a) a)production of cultural information material
- b) creation of a viewpoint
- c) fossil trail

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

ARQ.03 Scientific research

The scientific and cultural importance of the paleontological resources present has been recognized by the PHAM Project Owner, leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the Project Owner has taken on a commitment to enhance knowledge of the area before starting planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may be detected during the course of construction under the PHAM. These activities will contribute not only to the maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of materials or components present.

For more information, see **Annex 14 of Addendum 1**.

Remark N° 37
Cultural, Paleontological, and Natural
Heritage:
7. Protected areas: La Engorda
Meadow

The EIS contains plans to alter these meadows/wetlands through installing pipelines running underneath them, construction of inlets, and construction of certain access routes and the El Morado siphon. In this regard, it can be stated that - as is suggested by its name - this meadow and the vegetation that surrounds it represent a unique ecosystem, which is of particular importance due to its use fattening up livestock. Nonetheless, the Project does not feature suitable mitigation and compensation measures.

The Project Owner should include the mitigation and compensation measures that it therefore plans to implement.

Thematic responses

F&F Biodiversity Impact

Flora and
Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles,

70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of
species affected

Aquatic flora and
fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and
vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neoporteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial
fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Lilolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and
fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic

communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

F&F.02.02 Mitigation

Aquatic flora and fauna

The Project calls for a suite of multi-purpose environmental management measures that aim to minimize its effects on living organisms, including: minimization of watercourse areas to be subject to intervention by prioritizing such works for late summer and early fall seasons (period of lowest flow rates), the adoption of special precautions to prevent accidental spillages into watercourses (prohibition of the storage of lubricant drums in or near watercourses, etc), and permanent maintenance of ecological flow rates.

For more detailed information, including technical documentation that complements the information described above, see Annex 17 of the Addendum.

Terrestrial Flora and Vegetation

In order to prevent and/or minimize the Project's effects on plant life, it plans to adopt a number of integrative measures: micro-routing in advance of starting work on-site, in order to identify specimens of plants listed in any conservation category and subject to impact; compensation with the planting of 10 specimens for every one destroyed, in the case of non-woodland species listed for conservation; implementation of a woodland management plan applicable to woodland areas, which describes its measures in accordance with Article 5 of the Woodland Law; implementation of vegetation restoration plans at muck disposal sites, encampments, artificial slopes, and tunnel access terraces (EIS, Annexes 7 and 29). More in-depth information on complementary measures is provided in Annex 6 of Addendum 1.

Terrestrial fauna

Specific wildlife environmental management measures have been proposed for each particular species, taking into account prior experience in the success of these measures in similar projects. These measures will be implemented in continual coordination with the Servicio Agrícola y Ganadero. Principal measures include: capture of individuals belonging to species of conservation interest for rescue and relocation; controlled perturbation actions; and habitat replacement. Other measures are based on the use of signage, training for Contractors, and contractual requirements for on-site supervision (see details in Section 6.4.1.6 of the EIS).

See Annex 4 of the Addendum for the native wildlife rescue and relocation plan.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as

making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

SUE.01 Regulations

The Project Owner is subject to the following regulations, which are specified in detail in Chapter 5 of the EIS, Section 5.7.2.1, regarding the Santiago Metropolitan Master Plan.

With regard to planning instruments, the PHAM is to be implemented in the district of San José de Maipo, which does not have a District Master Plan (one is currently being prepared), and which only has current urban limits for the settlements of San Alfonso, La Obra, San José de Maipo, El Melocotón, San Gabriel, and Las Vertientes. Conversely, the Santiago Metropolitan Master Plan (PRMS) establishes a number of land use regulations that apply to the project area, most of which are related to ecological preservation and/or protection and risks. Most of the district's surface area is classed as Ecological Preservation Area, which aims to maintain a zone's natural state, in order to preserve and contribute to the environment's quality and equilibrium, as well as to preserve landscape heritage (see further information in the conclusions stemming from analysis of regulations, in Section 5.7.3, Chapter 5 of the EIS).

Supreme Decree 366 (Exploitation of Tamarugo, Carob, Chañar, Guayacán, Aextoxicon, Charcoal, Acacia, Boldo, Maiten, Litre, Bollen, and Quillay). This legal instrument governs the felling of trees and bushes.

Supreme Decree 4363 and D.L 701 (Approving the Definitive Text of the Law on Woodland and Regulations on Forest Promotion).

Article 2 of the Woodland Law establishes an obligation that land classified as for preferential woodland land use, as well as natural and artificial woodlands, are subject to woodland management plans approved by the National Forestry Commission (CONAF). Furthermore, Article 21 of Decree Law 701 establishes that any felling or usage of native woodland shall be subject to the CONAF's prior approval of the corresponding management plan.

Decree 82 (Prohibiting the Felling of Trees and Bushes in Indicated Andean High Mountain and Foothill Areas)

Article 102 Sector Environmental Permit (Permit for the felling or exploitation of native woodland, in any type of land, or plantations located in land with preferential characteristics for woodland use).

For further information and analysis on the aforementioned regulations and permits, as applicable to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see Sections 3.2.6 and 3.3.7 in Chapter 3 of the EIS.

SUE.02 Soils, meadows, and wetlands

The Project Owner has conducted a number of studies with the aim of characterizing the vegetation of summer grazing areas (La Engorda) (see details in Addendum 1, Annex 6, and in Chapter 5 of the EIS), as well as flora and vegetation studies in the Project's area of influence (EIS, Chapter 5).

These studies contain information compiled in fieldwork campaigns conducted in Fall 2005, Spring 2006, November 2007, March 15 and 16, 2008, and September 2008, which add to the body of knowledge available regarding vegetation in these areas.

The Lo Encañado area shall be assigned a status of controlled access area for works contractors at all times: it shall not be subject to any intervention whatsoever. For more information on vegetation areas that could be affected by the construction works, and to learn about mitigation measures proposed by the Project Owner, you are advised to review Annex 42 of the EIS and Annex 6 of the Addendum.

With regard to environmental regulations that apply specifically to vegetation and plant life, the Project Owner shall be subject to:

Supreme Decree 366 (Exploitation of Tamarugo, Carob, Chañar, Guayacán, Aextoxicon, Charcoal, Acacia, Boldo, Maiten, Litre, Bollen, and Quillay). This legal instrument governs the felling of trees and bushes.

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Remark N° 38

Effects of the presence of Run-of-the-River Hydroelectric Plants in the Maipo River Basin Regarding Renewal of Aggregates Resources

In accordance with Supreme Decree 95/01, Reglamento S.E.I.A.

Article 6: The Project generates significant adverse effects on the quality and quantity of renewable natural resources, including soil, water, and air.

THE PHAM'S EIS DOES NOT CONSIDER THE CORRECT MAGNITUDE OF IMPACTS ON NATURAL AGGREGATES RESOURCES in the Volcán, Colorado, Yeso, and Maipo Rivers.

According to the book *Industria del Árido en Chile – Sistematización de Antecedentes Técnicos Ambientales*, Volume I, Santiago, published in December 2001 by the Comisión Nacional de Áridos y Corporación de Desarrollo Tecnológico, with the support of the Ministry of Public Works, Ministry of Housing, and Chilean Chamber of Construction, aggregates resources are considered renewable if they are extracted from watercourses.

The run-of-the-river power plants that operate in the Upper Maipo Basin (Volcán Queltehues, Alfalfal, and Los Maitenes) have altered the natural dynamics of solids transport in the watercourses, particularly in the case of sands. This is due to the following facts:

- 1) Sand is trapped in sand traps, as it is damaging to headworks and turbines. If the water is returned to the watercourses, this does not occur in a timely manner; and the sections of watercourses between abstraction works and points of water return suffer a drop in solid transport capacity, as a result of the reduction in water flow rate;
- 2) Gravel trap flushing at intakes does not guarantee that sediments continue on downstream, as such events occur at low frequency - which factor, combined with the decline in flow rates, favors the consolidation of materials in the stretches between water abstraction and return;
- 3) The clean water returned into the watercourses causes erosion, does not contribute sediments, and generates an imbalance in aggregates resources (input without sediment and output with sediment implies erosion);
- 4) Persons engaged in artisanal sand production in San José de Maipo state that when the Alfalfal and Los Maitenes, located in the Colorado River sub-basin became operative, sand production in this sub-basin suffered a permanent decline of approximately 30%.

It should also be mentioned that, apart from the four sub-basins that form the Upper Maipo Basin (bounded by the Maipo River rain gauge station at El Manzano), at present only the El Volcán sub-basin is free of any intervention that could have a negative impact on sediment transport in the Upper Maipo River Basin.

It is considered necessary that the Project Owner should characterize the sediment transport dynamics of the Upper Maipo River Basin, as well as sources of production, and should evaluate levels of impact on sand transport, principally, associated with existing and planned power plants. This information should be included in the Environmental Impact Study baseline.

Furthermore, in order to evaluate the Project's impact on the sediment load from the Volcán River sub-basin, the Project Owner is required to include a complete hydrological study for this sub-basin, defined as the section of the Volcán River located immediately upstream of the point where it empties into the Maipo River.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study** presented in **Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap

particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses.

through periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (**AGU.06.01**), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted.

It can be concluded that the Maipo River system can be managed such that, With the Project operational, present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them.

Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

AGU.06.03 Maipo River Sand Production

With regard to the extraction of aggregates in the Maipo River, during the operations phase of the PHAM, the Project will not modify current natural sediment (aggregates) transport dynamics occurring in the river.

In effect, under the natural dynamics, sediment transport takes place mainly in the months of November, December, and January, as a result of snow and ice melt in the high mountains, and it is during this season that variations in

flow rate in the Maipo River caused by the project stand at their lowest levels. The same behavior applies to winter season rises in river level.

It must be pointed out that the PHAM returns water to the Maipo River in the Las Lajas area, located upstream of the El Canelo zone, and therefore downstream of this point the river's flow dynamics with the project shall be identical to those currently observed.

It is of great importance to observe that currently, without the PHAM in operation, slightly downstream of the Las Vertientes area (in the La Obra stretch of the river), during certain times of the year flow rate in the Maipo River watercourse drops significantly, leaving the river bed dry, due to water abstraction at the following intakes: La Sirena Channel, San Carlos Channel, Independent Intake owned by Aguas Andinas, etc.

Average water abstraction flow rates attributable to the main drinking water and irrigation intakes, many of which also make use of hydroelectric power as a byproduct, but discounting the effects of existing hydroelectric plants on these channels that discharge directly into the intakes, amounts to 113 m³/second, which is equal to the average annual flow rate in the Maipo River at Las Vertientes. Depending on water availability, the annual abstraction rate at these intakes varies between 78 and 164 m³/second.

This situation clearly explains the high level of perturbation observed in the behavior of the Maipo River watercourse downstream of Las Vertientes, where the riverbed is dry except during periods of increased water level and in unusually wet years.

It is for this reason that the Project Owner asserts that its activities will have no impact on the current situation in the sand extraction sites located on the Maipo River.

AGU.06.04 Discharge effects

Water capture in advance of in-situ gravel removal leads first to a reduction in sediment load in water carried through the headworks to the turbine rooms, while the solid materials that is retained is returned to the river. At the point where water is discharged from the plants (Las Lajas area), water that has passed through the turbines - which contains a certain quantity of sediment - once again mixes with the water in the rivers, returning to its original conditions in terms of

average sediment load (**Addendum, Section I, Question 28**).

At the point where water is returned to the Maipo River, in the Las Lajas area, there will be no degradation of the riverbed as it is composed entirely of rocks. It should be mentioned that the flow rate discharged from the PHAM at this

point is always lower than the flow rate in the Maipo River just upstream. During the operations phase of the Project, planned maintenance activities do not include any cleaning of tunnels and culverts. Inside the tunnels, the cross sectional area for water flow is small enough to prevent sedimentation. This is shown through the operation of the Alfalfal Plant for 20 years without any cleaning of the tunnels being included among maintenance activities.

The only operations that lead to the discharge of sediment are the discharge of gravel traps at the inlets, and the flushing of the sand traps, returning sediment to the river once a certain volume has built up within them. These operations are conducted intermittently and for short time periods (1 minute for sand traps, 10 minutes for gravel traps), at variable frequency depending on the season. For more information see the **Addendum, Section IV, Question 3.**

Remark N° 39

Erosion Impacts on the Maipo River Due to the Discharge of Clean Water and Hydrological Changes Due to Synergies Between Impacts

The Maipo River watercourse will suffer erosion downstream of the plants' spillways due to the effects of clean water, which carries no solids in suspension.

The water used in hydroelectric power generation are returned to the main course of the Maipo River between the El Canelo and El Manzano areas. In view of the operating capacity of these run-of-the-river power plants, which implies a potential discharge of 65 m³/s, is it cause for concern that no analysis has been conducted into the erosion effects of these altered flow dynamics downstream, which alter the natural drainage regime of the Upper Maipo River.

The Project Owner must evaluate the erosive effects of water returned to the system from the PHAM. The effect should be analyzed mainly for the months from October through March, during the ice melt season.

These negative effects are interlinked, as the lack of entry of solid materials downstream of the point of discharge results in imbalances that lead to changes in the Maipo River's hydrogeological system.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum.**

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study** presented in **Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfal Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total

solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential expected solid streambed wear/entrainment (transport capacity) in the rivers, calculated based on the theoretical modeling of their hydraulic characteristics

and theoretical numerical relationships.

2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (AGU.06.01), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted.

It can be concluded that the Maipo River system can be managed such that, With the Project operational, present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them.

Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

Remark N° 40

Impacts on Aggregates Extraction Activities in the Districts of San José de Maipo, Puente Alto, Pirque, San Bernardo, and Buin

The PHAM's planned water intakes in the Volcán River sub-basin will lead to the following effects:

- 1) Given that the Project will inhibit practically all of the water flow provided by ice-melt attributable to the Volcán River sub-basin during the October - March ice melt season, only water from the Maipo River sub-basin will be available to transport sediment in a stretch approximately 60 km in length, running from the junction with the Volcán River and the Maipo River to the junction with the Colorado River and the Maipo River. It should be noted that the Yeso River is totally modified by the Laguna Negra and Lo Encañado reservoirs, such that its contribution to ice melt water flow is insignificant or nonexistent;
- 2) Considering that it is a fact that most renewal of small particle size material occurs during the ice melt season, it can be stated that in terms of the renewal of aggregates resources, the PHAM shall impact 75% of such resources in the Upper Maipo River Basin - an utterly foreseeable impact with undefined repercussions in view of the nature of the Project, and therefore impossible to rule out;
- 3) Water discharged from the PHAM shall exacerbate the sediment deficit downstream of the point of discharge;
- 4) In the districts of San José de Maipo, Puente Alto, Pirque, San Bernardo, and Buin, intensive aggregates extraction activities are undertaken. This activity already presents limitation that are the subject of studies to determine whether there is a need to partially restrict extractive activities, and whether an environmentally sustainable project running across these districts can be instituted, taking in the stretch of river from the outflow of the Clarillo River through to the Puntilla de Lonquén Railway Bridge.

Additionally the DOH, by way of Official Communication DOH RM N° 462 dated 24 May, 2006, has imposed a zone where extractive activities are restricted running four kilometers upstream and downstream of the Maipo Bridge (Pan-American Highway), only approving projects based on the natural renewal of the resource. As the Maipo River falls within the jurisdiction of these districts, and in view of the ex-ante presence of the PHAM, and the vulnerable nature of this activity, the importance of aggregates as a raw material for construction, and economic and social repercussions particularly affecting irrigation, it can be shown that the PHAM's area of direct influence should extend through to the Maipo River at the Puntilla de Lonquén Railway Bridge. Studies required: In response to the questions raised above, the PHAM is requested to conduct the following studies in order to verify effects on the Maipo River in the medium and long term:

- * Study on the loss of aggregates through retention in intakes
- * Study on the loss of aggregates through reduced solid transport capacity in river water
- * Study on erosion in the river system through the effects of discharging clean water
- * Study on changes in the hydro-geological system of the Maipo River Valley

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should

be expected to contain 85% of the sediment in

suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (**AGU.06.01**), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted.

It can be concluded that the Maipo River system can be managed such that, With the Project operational, present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them.

Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

AGU.06.03 Maipo River Sand Production

With regard to the extraction of aggregates in the Maipo River, during the operations phase of the PHAM, the Project will not modify current natural sediment (aggregates) transport dynamics occurring in the river.

In effect, under the natural dynamics, sediment transport takes place mainly in the months of November, December, and January, as a result of snow and ice melt in the high mountains, and it is during this season that variations in

flow rate in the Maipo River caused by the project stand at their lowest levels. The same behavior applies to winter season rises in river level.

It must be pointed out that the PHAM returns water to the Maipo River in the Las Lajas area, located upstream of the El Canelo zone, and therefore downstream of this point the river's flow dynamics with the project shall be identical to those currently observed.

It is of great importance to observe that currently, without the PHAM in operation, slightly downstream of the Las Vertientes area (in the La Obra stretch of the river), during certain times of the year flow rate in the Maipo River watercourse drops significantly, leaving the river bed dry, due to water abstraction at the following intakes: La Sirena Channel, San Carlos Channel, Independent Intake owned by Aguas Andinas, etc.

Average water abstraction flow rates attributable to the main drinking water and irrigation intakes, many of which also make use of hydroelectric power as a byproduct, but discounting the effects of existing hydroelectric plants on these channels that discharge directly into the intakes, amounts to 113 m³/second, which is equal to the average annual flow rate in the Maipo River at Las Vertientes. Depending on water availability, the annual abstraction rate at these intakes varies between 78 and 164 m³/second.

This situation clearly explains the high level of perturbation observed in the behavior of the Maipo River watercourse downstream of Las Vertientes, where the riverbed is dry except during periods of increased water level and in unusually wet years.

It is for this reason that the Project Owner asserts that its activities will have no impact on the current situation in the sand extraction sites located on the Maipo River.

AGU.06.04 Discharge effects

Water capture in advance of in-situ gravel removal leads first to a reduction in sediment load in water carried through the headworks to the turbine rooms, while the solid materials that is retained is returned to the river. At the point where water is discharged from the plants (Las Lajas area), water that has passed through the turbines - which contains a certain quantity of sediment - once again mixes with the water in the rivers, returning to its original conditions in terms of

average sediment load (**Addendum, Section I, Question 28**).
At the point where water is returned to the Maipo River, in the Las
Lajas area, there will be no degradation of the riverbed as it is composed entirely

of rocks. It should be mentioned that the flow rate discharged from the PHAM at this point is always lower than the flow rate in the Maipo River just upstream.

During the operations phase of the Project, planned maintenance activities do not include any cleaning of tunnels and culverts. Inside the tunnels, the cross sectional area for water flow is small enough to prevent sedimentation. This is shown through the operation of the Alfalfal Plant for 20 years without any cleaning of the tunnels being included among maintenance activities.

The only operations that lead to the discharge of sediment are the discharge of gravel traps at the inlets, and the flushing of the sand traps, returning sediment to the river once a certain volume has built up within them. These operations are conducted intermittently and for short time periods (1 minute for sand traps, 10 minutes for gravel traps), at variable frequency depending on the season. For more information see the **Addendum, Section IV, Question 3.**

Remark N° 41

Impacts on the Socio-Economic Structure Regarding Activities Conducted by Artisanal Sectors and Industries Engaged in the Extraction of Aggregates Throughout All Tributaries of the Maipo River

In accordance with Supreme Decree 95/01, S.E.I.A. Regulations:

Article 8: The Project causes the resettling of human communities or significant changes in the ways of life or customs of human groups.

THE PHAM'S EIS DOES NOT CONSIDER IMPACTS ON SOCIO-ECONOMIC ASPECTS regarding activities conducted by artisanal sectors and industries engaged in the extraction of aggregates throughout all tributaries of the Maipo River.

- * The limits established for the PHAM's area of influence are insufficient in terms of establishing socio-economic impacts, given that in these terms the Project's environmental impact affects extractive activities in all tributaries of the river system, that is, from San José de Maipo to Lonquén.
- * The absence of a study to evaluate the existence of this activity, as well as the impacts that shall be caused by the PHAM. The environmental impact study ignores the presence of this industry sector, which is of importance for the development of the region.

GROUNDING FOR THE TWO REMARKS

A little history: Since around the year 1900, the banks of the Maipo River have been the site of major production activity in the field of aggregates extraction. During the early years, this was an almost purely small-scale activity, undertaken by the families who lived along the riverbanks, who suffered greater harm with every year that passed through the flooding of what was a very different watercourse to the form that it currently takes.

As the decades passed, this activity became an industry not only for the families who lived along the river's banks; as the industry grew, and as demand for aggregates in the region rose, the sector saw major development leading to the start of a significant industrial activity, advancing side by side with artisanal sectors. This was such a major industry that areas like the Cajón del Maipo owed their development to this extractive industry.

Starting in the 1990s, and with the return of democracy, the small-scale producers who were the descendents of the first families to settle on the riverbank formed syndicates that still exist today. This was also the time when the boundaries of extraction areas were set. On request by the "Federación 22 de Enero", which is an association of sand production syndicates in the Maipo River, and by way of the Zoning Act of 1990, it was agreed that a systems of zones would be established limiting extraction activities, applying to both sand production syndicates and companies active in the industry.

An integral part of this agreement constituted an artisanal aggregates extraction program in this stretch of the river, as well as 5 annexes containing basic information on the extraction program for each of the syndicates that made up the "Federación 22 de Enero", base cartographic material specifying the zoning system, and technical guidelines for aggregates extraction (artisanal and mechanized). Under the river's 1990 zoning system, areas are set aside exclusively for artisanal activities, and, in view of the rapid development of mechanized activities, other areas were specified for associated artisanal/mechanized extraction (with industrial groups).

On the Syndicates

Along the stretch of the river running from the Los Morros Bridge to the Maipo Bridge, 7 syndicates have been identified, in addition to the syndicates located in Pirque, Puente Alto, and Lonquén, all of which specifically identify their key activity as aggregates extraction and which possess significant organizational capacity. All in all, there are approximately 1500 persons employed exclusively in aggregates extraction, as well as a significant number of truck owners, drivers, and resource location personnel. It is therefore estimated that around 4,500 persons in the region make their living from this activity (consisting of the family groups to which each industry worker belongs).

Additionally, these syndicates form an important resource in terms of social support for their members, as they take on the role of providing social resources and materials when any of their members falls ill, or becomes unable to continue to engage in their work as a result of invalidity or old age. Thus, for example, a proportion of the financial resources earned through aggregates production is set aside to ensure the survival of persons who are unable to continue to take part in the industry for these reasons, and their families. This provision is also guaranteed for the widows of syndicate members.

On the Companies

In addition to the syndicates, approximately 14 companies are engaged in aggregates extraction along the Maipo River, not including the major cement production companies that gather this resource from the river - which shall also be affected by the Project, and which are similarly not considered in the EIS.

From a cultural point of view, it is important to underscore that the trade of sand production is one that is passed down from generation to generation. Children of producers start to take part in the activity at a very early age, when their parents or grandparents pass on their knowledge to the next generation. In this regard, even a temporary interruption in studies represents a significant problem for this group of people. In view of the relevance of this consideration explained above, the question thus arises of the possibility of a change in trade activity in the event that a lack of aggregates renders this sector non-productive - given that, as some syndicate members put it, "a sand man is born and dies in the river", and the knowledge and skills of syndicate members are strongly or exclusively linked to aggregates extraction. Furthermore, and as indicated above, a large number of persons are not directly engaged in aggregates extraction, but do depend on this industry for their livelihood. In this regard, any impact on the activity also implies the creation of new social problems specifically associated with unemployment, together with the disappearance of an item of cultural heritage that has been a driving force behind development in the region.

Regarding the questions: Based on the above, and from a socio-economic perspective, two questions are presented to the PHAM:

- * How will the Project ensure the permanence and development of extractive industry in the Maipo River?
- * How will the Project guarantee to municipal/district governments that it will ensure the permanence of resources derived from extraction, if the extractive industry is affected?

Studies required: In response to the questions raised above, the PHAM is requested to conduct a study of the socio-economic impacts that will be caused by the operation of the

Proyecto Hidroeléctrico Alto Maipo, affecting artisanal and mechanized sand extraction industries that depend on the Maipo River, in the medium and long term.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.06 Sediments

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**Chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

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Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.03 Maipo River Sand Production

With regard to the extraction of aggregates in the Maipo River, during the operations phase of the PHAM, the Project will not modify current natural sediment (aggregates) transport dynamics occurring in the river.

In effect, under the natural dynamics, sediment transport takes place mainly in the months of November, December, and January, as a result of snow and ice melt in the high mountains, and it is during this season that variations in flow rate in the Maipo River caused by the project stand at their lowest levels. The same behavior applies to winter season rises in river level.

It must be pointed out that the PHAM returns water to the Maipo River in the Las Lajas area, located upstream of the El Canelo zone, and therefore downstream of this point the river's flow dynamics with the project shall be identical to those currently observed.

It is of great importance to observe that currently, without the PHAM in operation, slightly downstream of the Las Vertientes area (in the La Obra stretch of the river), during certain times of the year flow rate in the Maipo River watercourse drops significantly, leaving the river bed dry, due to water abstraction at the following intakes: La Sirena Channel, San Carlos Channel, Independent Intake owned by Aguas Andinas, etc.

Average water abstraction flow rates attributable to the main drinking water and irrigation intakes, many of which also make use of hydroelectric power as a byproduct, but discounting the effects of existing hydroelectric plants on these channels that discharge directly into the intakes, amounts to 113 m³/second, which is equal to the average annual flow rate in the Maipo River at Las Vertientes. Depending on water availability, the annual abstraction rate at these intakes varies between 78 and 164 m³/second.

This situation clearly explains the high level of perturbation observed in the behavior of the Maipo River watercourse downstream of Las Vertientes, where the riverbed is dry except during periods of increased water level and in unusually wet years.

It is for this reason that the Project Owner asserts that its activities will have no impact on the current situation in the Sand extraction sites located on the Maipo River.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. The study also investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 42

Other Remarks

What is the contribution of the Volcán River sub-basin to total flow rates during the ice-melt season (October-March)?

What are the total contributions from ice-melt?

What is the effect on base flow rates in the rain precipitation and snow precipitation seasons?

What is the level of sediment input from the Volcán River sub-basin?

Why is it not deemed that all sediments from this sub-basin will be withdrawn, in view of its snow-driven flow dynamics?

How much sediment will be retained in high mountain intakes?

How much sand will be produced by the sand traps? Where will this material be disposed of?

Given that flow rates in the Volcán River sub-basin currently contribute not only to the snow melt flow of the Maipo River but also to the river's base flow rate, and given that the transport capacity will be modified in different sections of the river, how will the Project Owner manage this effect?

Sediment availability will decline not only through the inhibition of input from the Volcán River sub-basin, as well as through the erosive effect of the clean water discharged, but also because the transport capacity will be artificially increased in terms of magnitude and frequency. How will the Project Owner manage this effect?

In the EIS, the Project Owner indicates that it will construct a series of installations that shall have to be subcontracted, transferring the requirement for approval for the transport of aggregates from their point of extraction to the construction site; however, these works will be part of the Project. Clarification is required in this regard.

In the EIS, it is determined that the area of direct influence constitutes the district of San José de Maipo, as modifications to the hydro-geological dynamics of the river shall affect socio-economic issues that depend on aggregates resources (municipal government-run, industrial, and artisanal) beyond the limits of the area of direct influence. How does the Project Owner plan to remedy the deficiencies in the definition of the area of influence?

According to the latest reports on production activity, the Maipo River Basin has an annual renewal capacity of approximately 4 million cubic meters of aggregates, which are extracted from the stretch passing through the districts of an José de Maipo, Pirque, Puente Alto, San Bernardo, Buin, and Isla de Maipo. How does

the Project Owner plan to remedy potential reductions in this resource? Other Remarks:

- * The information provided contains discrepancies (example: flow rate information).
- * Information on the hydrological analysis commissioned by the Project Owner is missing.
- * Information permitting the suitable analysis of impacts of activities and construction conducted between the mouth of the Colorado River and the water discharge point at Las Lajas, and their dependence on hydraulic conditions in the river.
- * Impact through the changes that will be caused in the sedimentation dynamics of the river system is neither provided nor evaluated.

In light of the Project's predicted effects modifying flow patterns, the following effects are expected to arise in the sedimentation equilibrium of the watercourses subject to intervention (Yeso, Colorado, and Maipo Rivers):

- * Reduction in flow rate in the Volcán, Yeso, and Colorado rivers downstream of the intakes of the Alfalfal II hydroelectric plant will result in a decline in sediment transport capacity. This means that there will be a reduction in the average predicted contribution of sediments flowing from the aforementioned watercourses into the Maipo River, which, particularly downstream of the Colorado River, equates to 15% of predicted transport in the Las Vertientes area, and 25% of potential transport in the San Bernardo area (as the study indicates)
- * A sharp rise in transport capacity in the Maipo River at the point of discharge of the hydroelectric plant (confluence of the Maipo River with the El Manzano Stream), resulting from the discharge of clean water from the power plants.
- * The analysis presented does not consider the creation of local imbalances in the tributaries of the Maipo River.

This will lead to the degradation of the riverbed of the Maipo River. None of these potential effects are addressed in the sedimentation study, and in the transport capacity through the incorporation of clean water. Similarly, the effects of imbalances introduced in the input of aggregates or the extent of the watercourse affected, are also not addressed.

Finally, regarding solid transport dynamics, influencing the erosion – sedimentation equilibrium and transport in downstream stretches, the Project Owner is requested to define the area of direct and indirect influence for this component, including the activities of settling areas, artisanal and mechanical aggregate material extraction, and other uses of the watercourse.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the

watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.06 Sediment**

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum.**

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study** presented in **Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfal Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential expected solid streambed wear/entrainment (transport capacity) in the rivers, calculated based on the theoretical modeling of their hydraulic characteristics

and theoretical numerical relationships.

2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (AGU.06.01), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted.

It can be concluded that the Maipo River system can be managed such that, With the Project operational, present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them.

Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

AGU.06.04 Discharge effects

Water capture in advance of in-situ gravel removal leads first to a reduction in sediment load in water carried through the headworks to the turbine rooms, while the solid materials that is retained is returned to the river. At the point where water is discharged from the plants (Las Lajas area), water that has passed through the turbines - which contains a certain quantity of sediment - once again mixes with the water in the rivers, returning to its original conditions in terms of average sediment load (**Addendum, Section I, Question 28**).

At the point where water is returned to the Maipo River, in the Las Lajas area, there will be no degradation of the riverbed as it is composed entirely of rocks. It should be mentioned that the flow rate discharged from the PHAM at this point is always lower than the flow rate in the Maipo River just upstream.

During the operations phase of the Project, planned maintenance activities do not include any cleaning of tunnels and culverts. Inside the tunnels, the cross sectional area for water flow is small enough to prevent sedimentation. This is shown through the operation of the Alfalfa Plant for 20 years without any cleaning of the tunnels being included among maintenance activities.

The only operations that lead to the discharge of sediment are the discharge of gravel traps at the inlets, and the flushing of the sand traps, returning sediment to the river once a certain volume has built up within them. These operations are conducted intermittently and for short time periods (1 minute for sand traps, 10 minutes for gravel traps), at variable frequency depending on the season. For more information see the **Addendum, Section IV, Question 3**.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water

abstracted from the
upper reaches of the La Engorda, Colina, Las Placas, and El Morado
Streams and the El Yeso River downstream of the El Yeso Reservoir, as well
as water from the

upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfafal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfafal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfafal I and Alfafal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

Remark N° 43

1. Tourism

- * The EIS underestimates not only the present importance of tourism in the district, but also its potential, associated with a lack of infrastructure; similarly, it fails to mention that the district's main attraction consists of its natural scenic beauty.
 - * The Project Owner must indicate current and potential tourism demand in the region, in both qualitative and quantitative terms.
 - * Determine tourism service availability in the context of demand.
- * Describe and classify the tourism companies with special interests considered in the district, and the promotion of tourism service provision in the area.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent

decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **TUR Tourism**

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 44

2. Environmental Damage and Impact on Tourism

- * The death of rivers, intervention in the El Morado Natural Monument, the heaping up of 2,700,000 million m³ of muck, etc., are not cosmetic effects. Under Law 19,300, Art. 2, Part c, it is stated that "Environmental damage [means] any significant loss, decline, detriment, or harm caused to the environment, or to one or more of its components"
- * The Project Owner must define and distinguish between cosmetic effects and environmental damage.
- * Environmental damage will lead to a negative effect on tourism through the loss of landscape value and the absence of the area's typical ecosystems.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to

support outreach and awareness building of the District of San José de Maipo as a national tourism resource. Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents. F&F Biodiversity Impact**

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neopteris curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Liolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopus cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

F&F.02.02 Form of mitigation

Aquatic flora and fauna

The Project calls for a suite of multi-purpose environmental management measures that aim to minimize its effects on living organisms, including: minimization of watercourse areas to be subject to intervention by prioritizing such works for late summer and early fall seasons (period of lowest flow rates), the adoption of special precautions to prevent accidental spillages into watercourses (prohibition of the storage of lubricant drums in or near watercourses, etc), and permanent maintenance of ecological flow rates.

For more detailed information, including technical documentation that complements the information described above, see Annex 17 of the Addendum.

Terrestrial Flora and Vegetation

In order to prevent and/or minimize the Project's effects on plant life, it plans to adopt a number of integrative measures: micro-routing in advance of starting work on-site, in order to identify specimens of plants listed in any conservation category and subject to impact; compensation with the planting of 10 specimens for every one destroyed, in the case of non-woodland species listed for conservation; implementation of a woodland management plan applicable to woodland areas, which describes its measures in accordance with Article 5 of the Woodland Law; implementation of vegetation restoration plans at muck disposal sites, encampments, artificial slopes, and tunnel access terraces (EIS, Annexes 7 and 29). More in-depth information on complementary measures is provided in Annex 6 of Addendum 1.

Terrestrial fauna

Specific wildlife environmental management measures have been proposed for each particular species, taking into account prior experience in the success of these measures in similar projects. These measures will be implemented in continual coordination with the Servicio Agrícola y Ganadero. Principal measures include: capture of individuals belonging to species of conservation interest for rescue and relocation; controlled perturbation actions; and habitat replacement. Other measures are based on the use of signage, training for Contractors, and contractual requirements for on-site supervision (see details in Section 6.4.1.6 of the EIS). See Annex 4 of the Addendum for the native wildlife rescue and relocation plan.

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.01 River sports

During the operations phase, the activities of the PHAM shall not directly or indirectly interfere with tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. Furthermore, the PHAM shall have no significant effect on boating activities on the Maipo River as a result of reductions in river flow rate; an analysis is presented in Annex 17 of the Addendum modeling a number of hydrological scenarios (1), concluding that the PHAM shall not affect the current situation in rafting and kayaking activities conducted in the area between San Gabriel and San José de Maipo.

In order to establish an analysis comparing the current Maipo River boating situation with predictions for the situation with the Project operational, the variables of flow rate, river width, and water depth were modeled, as valid indices to establish conditions for boating activities on the Maipo River.

This analysis showed that the Project shall not interfere with tourism activities conducted on the Maipo River, in view of estimates that in a dry year, the magnitude of variations in flow rate and water depth will not cause interference with boating activities.

For more information, see **Annex 17 of Addendum 1**.

- (1) The hydrological analysis used to evaluate reductions in flow rate is based on a statistical record going back 50 years, thus ensuring that seasonal and annual variations are incorporated into the analyses conducted.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training,

advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the

possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

TUR.03 Visual impact

The Project is to be located, taking into account esthetic and perceptual considerations and emphasizing the characterization and appraisal of the issues of visibility, quality, and visual fragility of the landscape.

In terms of Landscape Alteration or Landscape Impact associated with this infrastructure project, potential effects are classified as either limited duration - generally applying during the construction phase - or permanent, for effects that shall persist during the operations phase and continue throughout the working life of the Project. A qualitative methodology is used to study these effects, whereby the first phase consists of identifying sources of visual impact, and the second phase relates to identifying and classifying environmental impacts.

As a general rule, it is assumed that impact on the landscape during the construction phase shall be temporary, mainly due to the transitory nature of the sources of impact, the low level of prior human activity in certain areas, and the relatively low level of physical and visual accessibility of a significant proportion of the area subject to intervention.

As most of the Project construction works will be situated underground, during the operations phase the main visual signatures of its existence will be the intakes and access roads.

For further information on the methodology used for landscape impact assessment, see **Chapter 6, Section 6.1.4.10 of the EIS, and Annex 17 of**

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayes, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions.

The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS**.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

Remark N° 45

3. Watercourses Subject to Intervention

- * Given that, in view of its characteristics and natural monuments, the Cajón del Maipo valley has been declared a ZOIT Zone of National Interest, the Project Owner is requested to analyze and evaluate to what extent the impacts to be generated by the PHAM in the area subject to intervention are compatible with the district's role as a tourism destination.
- * The AES Gener Colorado River installations abstract 100% of water from the Maitenes, and the company agrees to maintain an ecological flow rate of 0.7 m³/second, allowing the river to dry out almost completely. This situation is not, as AES Gener would have it, "a merely cosmetic effect visible from certain points", but rather leads to serious consequences affecting the area's tourism and economy. The entire south-east riverbank is an area with many scenic areas, and its natural beauty brings in a large influx of persons throughout the year. The Colorado Valley does not, as Gener states, require tourism infrastructure in order to be visited; Chilean and foreign tourists come to the Cajón del Maipo in search of our natural world. A trail winds along the length of the river, where hikers can find crofters' cottages selling goat cheese, viewpoints looking out over the river, places where condors can be sighted, horse riding routes, native woodland, sites where UFOs are said to be seen, and endemic flora and wildlife, all in a harmonious riverside ecosystem that is now going to disappear.
- * The same situation occurs once again in the El Morado Stream, which will be left with a flow rate of 0.24 m³/second, the La Engorda Stream with 0.2 m³/second, the Colina Stream with 0.3 m³/second, and the Las Placas Stream with 0.14 m³/second. If these ecological flow rates are permitted, these watercourses will dry out. This will lead to the disappearance of their ecosystems as well as their landscape and recreational value.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal.

Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual

Remark N° 66 Units of Measurement

The Environmental Impact Study should present all relevant figures on flow rates in a single unit of measurement, permitting clear comparison between the flow rates that the project plans to abstract as against the flow rates that exist in each river in each area of each valley that will be affected, from the Valle de las Arenas through to El Manzano.

It shows a lack of rigor to present some figures in liters per second (l/s) and others in cubic meters per second (m³/s).

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components

(stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a

conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **F&F Biodiversity Impact**

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3**, and **Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes

the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neoporteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo Spinolosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Liolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

SUE.02 Soils, meadows, and wetlands

The Project Owner has conducted a number of studies with the aim of characterizing the vegetation of summer grazing areas (La Engorda) (see details in Addendum 1, Annex 6, and in Chapter 5 of the EIS), as well as flora and vegetation studies in the Project's area of influence (EIS, Chapter 5).

These studies contain information compiled in fieldwork campaigns conducted in Fall 2005, Spring 2006, November 2007, March 15 and 16, 2008, and September 2008, which add to the body of knowledge available regarding vegetation in these areas.

The Lo Encañado area shall be assigned a status of controlled access area for works contractors at all times: it shall not be subject to any intervention whatsoever. For more information on vegetation areas that could be affected by the construction works, and to learn about mitigation measures proposed by the Project Owner, you are advised to review Annex 42 of the EIS and Annex 6 of the Addendum.

With regard to environmental regulations that apply specifically to vegetation and plant life, the Project Owner shall be subject to: **Supreme Decree 366** (Exploitation of Tamarugo, Carob, Chañar, Guayacán, Aextoxicon, Charcoal, Acacia, Boldo, Maiten, Litre, Bollen, and Quillay). This legal instrument governs the felling of trees and bushes.

Supreme Decree 4363 and D.L 701 (Approving the Definitive Text of the Law on Woodland and Regulations on Forest Promotion).

Article 2 of the Woodland Law establishes an obligation that land classified as for preferential woodland land use, as well as natural and artificial woodlands, are subject to woodland management plans approved by the National Forestry Commission (CONAF). Furthermore, Article 21 of Decree Law 701 establishes that any felling or usage of native woodland shall be subject to the CONAF's prior approval of the corresponding management plan.

Decree 82 (Prohibiting the Felling of Trees and Bushes in Indicated Andean High Mountain and Foothill Areas)

Article 102 Sector Environmental Permit (Permit for the felling or exploitation of native woodland, in any type of land, or plantations located in land with preferential characteristics for woodland use).

For further information and analysis on the aforementioned regulations and permits, as applicable to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see Sections 3.2.6 and 3.3.7 in Chapter 3 of the EIS.

TUR Tourism

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district;

that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of

natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán. For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.01 River sports

During the operations phase, the activities of the PHAM shall not directly or indirectly interfere with tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. Furthermore, the PHAM shall have no significant effect on boating activities on the Maipo River as a result of reductions in river flow rate; an analysis is presented in Annex 17 of the Addendum modeling a number of hydrological scenarios (1), concluding that the PHAM shall not affect the current situation in rafting and kayaking activities conducted in the area between San Gabriel and San José de Maipo.

In order to establish an analysis comparing the current Maipo River boating situation with predictions for the situation with the Project operational, the variables of flow rate, river width, and water depth were modeled, as valid indices to establish conditions for boating activities on the Maipo River.

This analysis showed that the Project shall not interfere with tourism activities conducted on the Maipo River, in view of estimates that in a dry year, the magnitude of variations in flow rate and water depth will not cause interference with boating activities.

For more information, see **Annex 17 of Addendum 1**.

- (1) The hydrological analysis used to evaluate reductions in flow rate is based on a statistical record going back 50 years, thus ensuring that seasonal and annual variations are incorporated into the analyses conducted.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

TUR.03 Visual impact

The Project is to be located, taking into account esthetic and perceptual considerations and emphasizing the characterization and appraisal of the issues of visibility, quality, and visual fragility of the landscape.

In terms of Landscape Alteration or Landscape Impact associated with this infrastructure project, potential effects are classified as either limited duration - generally applying during the construction phase - or permanent, for effects that shall persist during the operations phase and continue throughout the working life of the Project. A qualitative methodology is used to study these effects, whereby the first phase consists of identifying sources of visual impact, and the second phase relates to identifying and classifying environmental impacts.

As a general rule, it is assumed that impact on the landscape during the construction phase shall be temporary, mainly due to the transitory nature of the sources of impact, the low level of prior human activity in certain areas, and the relatively low level of physical and visual accessibility of a significant proportion of the area subject to intervention.

As most of the Project construction works will be situated underground, during the operations phase the main visual signatures of its existence will be the intakes and access roads.

For further information on the methodology used for landscape impact assessment, see **Chapter 6, Section**

6.1.4.10 of the EIS, and Annex 17 of Addendum 1.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayes, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions.

The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS**.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

Remark N° 46

4. Impact on the El Manzano Area

- * The El Manzano Channel intake is linked to the Colorado River's hydrological system, providing irrigation water to the 292 hectare area that makes up the El Manzano area.
- * Due to the decline in flow rate in the river, works must be constructed in order to permit the abstraction of water over which rights are held, yet the company AES Gener refuses to enter into any kind of economic agreement relating to the maintenance of these installations, leaving the community economically and technically responsible for maintaining its irrigation system. If this problem is not solved, El Manzano will become a desert, rather than the green pasture that it is today. This will certainly affect all trade and the area's tourism companies, as they are absolutely dependent on keeping their surroundings green.
- * The Project Owner is requested to attach a layout map of the companies present in this area, fruit orchards, plant nurseries, camp sites, picnic areas, restaurants, bee keepers, producers of jams/jellies and nuts and nuts or dried fruits, animal feed plants, etc, which directly or indirectly depend on irrigation water for their production processes or additional value added.
- * Attach a layout map of properties that depend on irrigation water to maintain their scenic value.
- * Establish a system of compensation to mitigate the impact leading to declines in property values and in quality of life.

Thematic responses

Specific response

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4 in Chapter 2 of the EIS**.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that is, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**).

AGU.02.02 “Hanging” channels

Gener has repeatedly issued declarations that it is aware that not only the works that it

shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by

community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.03 Decline in land value

Road conservation activities planned shall not involve urban areas. Road conservation activities shall be implemented mainly along mountain roads, particularly on the Alto Volcán area and El Yeso Reservoir access routes (Route G-25 and Route G-455, respectively).

Road widening actions are not planned, given that, according to the Project's Basic Engineering Studies, the roads subject to conservation works have a wide enough roadway for the passage of trucks, as defined by the Highways Department; therefore, no expropriation of land will take place.

With regard to land values, it can be stated that lots located alongside Route G-345 have increased in value significantly with the development of the access route to Maitenes and Alfalfal.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. In parallel, the study investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

Remark N° 47

5. Labor Hiring

The Project Owner overestimates job creation, whereas the contractor and not the company itself shall be in charge of hiring. Gener must:

- * Quantify the amount of labor that it shall hire in the district.
- * Describe the positions to be filled.

* Establish a binding agreement between the Project Owner and the Municipal Government whereby Gener agrees to source 100% of the persons who have registered at the labor brokerage office.

Thematic responses

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.01 Jobs in the District

Local labor availability is estimated based on figures from the Labor Brokerage and Information Office. This information will be made available to construction contractors so that they can preferentially hire local workers. According to information compiled at the Project Office in San José de Maipo, the project has registered a total of 980 potential project workers, of whom 390 are unemployed, broken down as follows:

Mine workers:	105
Carpenters, Builders, and Rebar Layers:	157
Heavy Machinery Operators:	131
Non-specialized day laborers:	39
Drivers:	87
Specialized technical personnel:	60
Welders:	26
Foremen and supervisors:	7
Graduate professionals:	20
Cleaning, security, and canteen workers:	120
Administrative personnel:	91
Other, misc.:	139

The average project workforce during the construction phase (5 years) is estimated at 2000 persons, and during the Citizen Participation process the company has agreed to ensure that an average of at least 500 local persons will be on the payroll during the construction of the Project.

SOC.01.01 Requirements

In view of the characteristics and scale of the Project, personnel with specific qualifications will be required for the operation and maintenance of plant machinery and equipment, during the operations phase. Conversely, during the Project Construction Phase, it is projected that labor requirements will create jobs not only for mining workers, but also for machinery operators, drivers, and both skilled and unskilled construction personnel, the latter working mainly as day laborers and assistants.

The population of the Project's area of direct influence has been found to possess levels of training and specialization (occupation as defined under the CIIU code) that shall permit them to access both skilled and unskilled work positions created by the Project.

SOC.01.02 Working conditions

To date no schedule exists specifying labor requirements for the full duration of the construction phase. Detailed information specifying jobs created under average and peak labor requirements, broken down by labor requirement dynamics for each encampment, will only be available once the Project Owner has tendered the works contracts.

During the operations phase, it is expected that personnel requirements will amount to approximately 80 positions available, required for power plant operations and maintenance activities. Unlike work positions created during the construction phase, the jobs created in the operations phase will be permanent (EIS, Chapter 6, Section 6.4.2.4).

The Project Owner will provide for coordination between the construction works contractors, the Labor Brokerage Office, and the Municipality of San José de Maipo, regarding local labor required and jobs sought. The PHAM has accepted a commitment to incentivize works contractors to prioritize local contracting of labor required.

No prior training is planned in advance of the Construction Phase. However, such training will form part of the programs implemented in the more advanced phases of the project.

Remark N° 48

6. Maitenes Foundation

The funds that Gener is offering to finance education and tourism projects should not be handled by its Maitenes Foundation. A foundation should be formed that is external to the company, representing not only Gener but also the principal community organization in the district, and the Municipal Government.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

CAL.02 Education

A goal of the Maitenes Foundation relates to education for children and young people against the backdrop of the natural environment (for more information on the goals and achievements of the Foundation, see Annex 26 of the EIS).

Gener firmly believes that contributions to the technical and vocational education and training of young people must keep sight of real employment possibilities. Therefore, as a first initiative it has earmarked resources for an education improvement project in the district, which will contribute to establishing education management for the restructuring of the school curriculum and professional technical capacity building, taking into account the features needed to boost local employability. Based on information and recommendations from this study, Gener, acting through the Maitenes Foundation, will undertake a Capacity Building for Employability Program fundamentally oriented towards those whose family, social, or economic situation has barred them from completing their education and training, or acquiring the skills needed in order to find work.

Remark N° 49

7. Supply Purchase Agreements

The Project Owner overestimates the benefit that will be generated for the community through the purchase of supplies and the presence of 20 encampments.

The Project Owner should enter into a binding agreement with the SJM Chamber of Commerce and Tourism, agreeing that all supplies required in the functioning of the encampments shall be acquired in the district.

Thematic responses

Specific response

The Project owner is not able to agree to this request because it goes against the concepts of free competition, and it is also unable to oblige contractors to purchase their supplies in the district.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

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The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent

decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.05 Promoting entrepreneurship

The company has agreed to use its **Fundación Maitenes** foundation to set aside an **annual fund over a 10 year period starting in 2010**, to support local residents who formulate tourism development business plans for implementation in the area. These projects will be financed through funds open for competitive tenders; submissions will be evaluated on their own merit by a council of community representatives, which will select which projects will be funded.

The initiative to be implemented by the Fundación Maitenes may be linked to projects in progress run by public institutions and services in the district, related to the two lines of action that the foundation has agreed to support. This linkage may help to strengthen state-run initiatives and foster sustainability over the course of time for the actions supported by the foundation, during the period in which the program is active.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. In parallel, the study investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 50

8. El Morado Natural Monument

- * The construction and operation of the El Volcán Tunnel underneath the El Morado Natural Monument (a SNASPE site) is not compatible with the environmental conservation objectives defined in legal instruments in force in the country.
- * This should not be evaluated as an environmental impact, but rather in terms of requirements stipulated in conservation legislation.

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1)

Chapter 3 of the EIS provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

Remark N° 51

9. Characterization of Impact on the El Morado Natural Monument

Environmental impact should be characterized with regard to:

- * The rate at which damage occurs, with the aim of modeling regeneration capacity.
- * The extent to which the impact is irreversible, and the damage universal. This impact affects not only a specific location, but also the nation's heritage.

Thematic responses

Specific response

The PHAM shall have no effect on the El Morado Natural Monument as its presence in this area will be limited to a tunnel passing under the area at a great depth.

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

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For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material
- b) creation of a viewpoint
- c) fossil trail

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas,

Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

PRO.03.02 Tunnels

The majority of the Project is planned for installation underground. The general characteristics of the tunnels are described in Chapter 2 of the EIS, Table 2.2.5 (for detailed geological information on the path taken by the tunnels, see Annex 46 of the EIS).

For an evaluation of the impact and environmental management measures associated with underground installations, see Chapter 6 of the EIS.

Annex 45 of the EIS, Hydro-Geology of Underground Works, presents a general description of the geological conditions that are expected to be found along the lengths of the tunnels; expected permeability based on geological knowledge and hydro-geological conditions in the area, incorporating experience gained during the construction of tunnels for the Alfalfal Plant, which has been operative for more than 17 years; as well as a description that includes the design of the tunnels, providing a brief explanation of the methods to be used to reduce and control water seepage.

With regard to the impact of the path taken by the tunnel passing underneath the El Morado Natural Monument, and measures to be taken to respect the area, see Section I, Responses 4, 5, and 6, in the Addendum.

Remark N° 52

Labor Hiring

The contractor and not the company itself shall be in charge of hiring. Gener

- must: a) Quantify the amount of labor that it shall hire in the district.
b) Describe the positions to be filled.

c) Establish a binding agreement between the Project Owner and the Municipal Government whereby Gener agrees to source 100% of the persons who have registered at the labor brokerage office.

Thematic responses

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.01 Jobs in the District

Local labor availability is estimated based on figures from the Labor Brokerage and Information Office. This information will be made available to construction contractors so that they can preferentially hire local workers. According to information compiled at the Project Office in San José de Maipo, the project has registered a total of 980 potential project workers, of whom 390 are unemployed, broken down as follows:

Mine workers:	105
Carpenters, Builders, and Rebar Layers:	157
Heavy Machinery Operators:	131
Non-specialized day laborers:	39
Drivers:	87
Specialized technical personnel:	60
Welders:	26
Foremen and supervisors:	7
Graduate professionals:	20
Cleaning, security, and canteen workers:	120
Administrative personnel:	91
Other, misc.:	139

The average project workforce during the construction phase (5 years) is estimated at 2000 persons, and during the Citizen Participation process the company has agreed to ensure that an average of at least 500 local persons will be on the payroll during the construction of the Project.

SOC.01.01 Requirements

In view of the characteristics and scale of the Project, personnel with specific qualifications will be required for the operation and maintenance of plant machinery and equipment, during the operations phase. Conversely, during the Project Construction Phase, it is projected that labor requirements will create jobs not only for mining workers, but also for machinery operators, drivers, and both skilled and unskilled construction personnel, the latter working mainly as day laborers and assistants.

The population of the Project's area of direct influence has been found to possess levels of training and specialization (occupation as defined under the CIIU code) that shall permit them to access both skilled and unskilled work positions created by the Project.

SOC.01.02 Working conditions

To date no schedule exists specifying labor requirements for the full duration of the construction phase. Detailed information specifying jobs created under average and peak labor requirements, broken down by labor requirement dynamics for each encampment, will only be available once the Project Owner has tendered the works contracts.

During the operations phase, it is expected that personnel requirements will amount to approximately 80 positions available, required for power plant operations and maintenance activities. Unlike work positions created during the construction phase, the jobs created in the operations phase will be permanent (EIS, Chapter 6, Section 6.4.2.4).

The Project Owner will provide for coordination between the construction works contractors, the Labor Brokerage Office, and the Municipality of San José de Maipo, regarding local labor required and jobs sought. The PHAM has accepted a commitment to incentivize works contractors to prioritize local contracting of labor required.

No prior training is planned in advance of the Construction Phase. However, such training will form part of the programs implemented in the more advanced phases of the project.

Remark N° 53 Maitenes Foundation

The funds that Gener is offering to finance education and tourism projects should not be handled by its Maitenes Foundation. A foundation should be formed that is external to the company, representing not only Gener but also the principal community organization in the district, and the Municipal Government.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

CAL.02 Education

A goal of the Maitenes Foundation relates to education for children and young people against the backdrop of the natural environment (for more information on the goals and achievements of the Foundation, see Annex 26 of the EIS).

Gener firmly believes that contributions to the technical and vocational education and training of young people must keep sight of real employment possibilities. Therefore, as a first initiative it has earmarked resources for an education improvement project in the district, which will contribute to establishing education management for the restructuring of the school curriculum and professional technical capacity building, taking into account the features needed to boost local employability. Based on information and recommendations from this study, Gener, acting through the Maitenes Foundation, will undertake a Capacity Building for Employability Program fundamentally oriented towards those whose family, social, or economic situation has barred them from completing their education and training, or acquiring the skills needed in order to find work.

Remark N° 54

El Manzano Environmental Impact Study

The EIS presented by Gener does not include impact that will be generated by the PHAM at El Manzano. The

EIS should include:

1. Identification, prediction, interpretation, mitigation plan, and evaluation of the impact that will be caused, particularly with regard to irrigation systems.
2. Actions that shall be taken to mitigate the significant negative impacts that will be generated by the PHAM.

Thematic responses

Specific response

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in **Chapter 2 of the EIS**.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 channels

"Hanging"

Gener has repeatedly issued declarations that it is aware that not only the works that it

shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

PRO.02 EIS Additional and Complementary Information

In accordance with consultation procedures conducted by oversight services, further studies and information have been incorporated into Addendum 1, which complements existing information provided in the EIS. Regarding ecological flow rates (**Annex 17**), cultural heritage (**Annex 14**) and the management of summer grazing areas (**Annex 6**).

Remark N° 55 Irrigation User Organizations: El Manzano Channel and Maurino Channel

In view of the drop in water flow in the Colorado River, irrigation user organizations will find it impossible to abstract the quantities of water to which they have rights.

1. The Project Owner should include the construction of such installations as shall be necessary to avoid this impact, and the commitment that has been expressed to defray all costs arising through the construction and maintenance of these installations.
2. The Project should include guarantees and compensation payable in the event that these organizations are rendered unable to abstract the water to which they hold rights.
3. The Project Owner should attach written consent by the "El Manzano Channel" and "Maurino Channel"

Thematic responses

Specific response

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in
**Chapter 2 of the
EIS.**

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

PRO.01.01 Compensation

The concept of compensation refers to the act of indemnifying damages or harm caused. Within the framework of the EIS, the Project Owner has issued a proposal to the competent authority regarding a suite of environmental management measures aiming to minimize, compensate, and restore the Project's impacts, making their implementation sustainable (Chapter 6 of the EIS).

In this regard, compensation is understood to be included in the spirit or end goal of the environmental management measures proposed by the Project Owner, following the evaluation of the direct and indirect effects of the PHAM on each of the environmental components stipulated in Supreme Decree 95, SEIA Regulations.

Remark N° 56 Colorado River EIS

- * The impact to arise as a result of the decline in flow rates in the Colorado River is not a cosmetic effect that is justified through the absence of tourism-related infrastructure.
- * The Project Owner must provide documented background information forming the grounds for the prediction, identification, and interpretation of the impact that these actions shall cause.
- * It should also describe the actions that it shall take in order to prevent or minimize all significantly negative effects.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services. For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of**

flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention

under the PHAM consists of maintaining an ecological flow rate (Q_e) approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility
(Addendum, Section 5,

Question 2).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	Stream gauge station		
	406,157	6,259,100	
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

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For more information, see **Annex 17 of the Addendum.CAL Impact on Quality of Life**

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plant (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as

they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be

increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **PRO.01.01 Compensation**

The concept of compensation refers to the act of indemnifying damages or harm caused. Within the framework of the EIS, the Project Owner has issued a proposal to the competent authority regarding a suite of environmental management measures aiming to minimize, compensate, and restore the Project's impacts, making their implementation sustainable (Chapter 6 of the EIS).

In this regard, compensation is understood to be included in the spirit or end goal of the environmental management measures proposed by the Project Owner, following the evaluation of the direct and indirect effects of the PHAM on each of the environmental components stipulated in Supreme Decree 95, SEIA Regulations.

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.01 River sports

During the operations phase, the activities of the PHAM shall not directly or indirectly interfere with tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. Furthermore, the PHAM shall have no significant effect on boating activities on the Maipo River as a result of reductions in river flow rate; an analysis is presented in Annex 17 of the Addendum modeling a number of hydrological scenarios (1), concluding that the PHAM shall not affect the current situation in rafting and kayaking activities conducted in the area between San Gabriel and San

José de Maipo.

In order to establish an analysis comparing the current Maipo River boating situation with predictions for the situation with the Project operational, the variables of flow rate, river width, and water depth were modeled, as valid indices to establish conditions for

boating activities on the Maipo River.

This analysis showed that the Project shall not interfere with tourism activities conducted on the Maipo River, in view of estimates that in a dry year, the magnitude of variations in flow rate and water depth will not cause interference with boating activities.

For more information, see **Annex 17 of Addendum 1**.

- (1) The hydrological analysis used to evaluate reductions in flow rate is based on a statistical record going back 50 years, thus ensuring that seasonal and annual variations are incorporated into the analyses conducted.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 57

Ecological flow rate: Colorado River

- * The ecological flow rate should be defined by the DGA, not by the Project Owner
- * The point where this flow rate is to be measured and monitored should be sited at the mouth of the Colorado River.
- * Flow rate monitoring should include the participation of outside agencies, that are not hired by the company.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate time series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of**

flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Q_e) approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Northing	Easting
	Alto Volcán	406,157	6,259,100
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 58 Yeso River EIS

- * Gener holds rights over water in the Yeso River amounting to 15 m³/sec. These rights were granted without ecological flow rate requirements. The Project plans to abstract 15 m³/sec of water 700 m downstream of the reservoir. An impact that leads to the death of a river is not a cosmetic effect, as the Project Owner would have it:
- * The Project Owner must provide documented background information forming the grounds for the prediction, identification, and interpretation of the impact that implies the death of the Yeso River.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4 in Chapter 2 of the EIS.**

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been

conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs,

zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
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With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 59

Ecological flow rates: Colina, Engorda, Las Placas, and El Morado Streams

* The flow rates proposed by the Project Owner would alter conditions in the watercourse, impede the development of living components of the ecosystem (plants and animals), and would affect the dynamics and functioning of the ecosystem.

* The Project Owner should describe the actions that it shall take in order to mitigate all significantly negative effect resulting from declines in flow rate.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of

the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

AGU.04.04 Monitoring and control of flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Q_e) approved by the DGA. In the case of the PHAM,

the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses. Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

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Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Eastings	Northing
	Alto Volcán	Stream gauge station	6,259,100
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

F&F Biodiversity Impact Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02.01 Impact Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to

intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly

reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

Remark N° 60

Effects on the Quality of Life in the Baños Morales Community

It is stipulated in Law 19,300, Article 11, parts d and e:

Projects or activities shall require the preparation of an Environmental Impact Study if they generate or lead to at least one of the following effects, characteristics, and circumstances:

- a) Localization close to a settlement or protected natural resources subject to impact, as well as the environmental value of the area in which they are planned to be implemented;
- b) Alteration of the area's landscape or tourism value, of significant magnitude or duration.

No part of the EIS prepared by AES Gener makes reference to the human impact that this project shall cause affecting the quality of life in the settlement of Baños Morales, with the installation of an encampment housing 500 persons close to the community, under circumstances that by law require the preparation of an Environmental Impact Study.

It is therefore requested that the corresponding study be conducted, in order to determine the concrete way in which we as a community shall be affected.

Thematic responses

Specific response

There shall be no direct impact in the settlement of Baños Morales as there shall be no encampments or traffic flow close to the area.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the

dynamism of all activities in the District of San José de Maipo; iii)
Improvement in quality of life for many families, as family members
return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.02 Human contingent presence

The presence of Project employees will be temporary (limited both to the years of the construction phase, and to the working day organized into shifts), thus disincentivizing them and their families from moving to the area on a permanent basis. During the Project's construction phase, its employees shall sleep in the encampments described in the documentation, not making use of existing hotels and hostels located in and near the area's settlements.

Once the construction phase has been completed, the Project's installations and encampments shall be removed; they shall therefore not become part of existing settlements, or form new centers for the formation of settlements.

The PHAM plans call for the creation of 5 encampments, located away from settlements. These encampments will be operated as described in Annex 33, and each will house a permanent contingent of 200-400 employees, under the standard working regime adopted by mining installations. The transport of employees from the encampments to their places of residence shall have a frequency determined in accordance with the working shifts. Therefore, it is important to understand that under no circumstances shall the presence of Project employees in the area lead to the type of interaction with

the resident community and demand for local services that currently occurs as a result of the flow of tourists and visitors, mainly during weekends, holidays, and the summer season.

In view of the above, the Project shall not lead to the following potential impacts: overpopulation at a local or district level (in existing settlements); or effects modifying local customs, economic service provision activities, connectivity, and local load capacity (understood to refer to the load placed on infrastructure and equipment).

As indicated in Annex 39 of the EIS, documentation supporting the analysis described above shall form part of activities under the Social Indicator Monitoring (SIM) program. This monitoring program is based on compiling information using qualitative and quantitative techniques developed in the field of Social Sciences, oriented towards investigating a suite of indices that pay due heed to trends in relevant variables for monitoring, selected in accordance with the characteristics of the Project and of the communities in the area where it is to be implemented. Reports will be issued twice per year containing the results obtained, including the use of graphical aids to show comparative changes in parameters from one study campaign to the next. This document will be delivered to CONAMA.

In general, by gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project may cause in its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities.

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.03 Visual impact

The Project is to be located, taking into account esthetic and perceptual considerations and emphasizing the characterization and appraisal of the issues of visibility, quality, and visual fragility of the landscape.

In terms of Landscape Alteration or Landscape Impact associated with this infrastructure project, potential effects are classified as either limited duration - generally applying during the construction phase - or permanent, for effects that shall persist during the operations phase and

continue throughout the working life of the Project. A qualitative methodology is used to study these effects, whereby the first phase consists of identifying sources of visual

impact, and the second phase relates to identifying and classifying environmental impacts. As a general rule, it is assumed that impact on the landscape during the construction phase shall be temporary, mainly due to the transitory nature of the sources of impact, the low level of prior human activity in certain areas, and the relatively low level of physical and visual accessibility of a significant proportion of the area subject to intervention.

As most of the Project construction works will be situated underground, during the operations phase the main visual signatures of its existence will be the intakes and access roads. For further information on the methodology used for landscape impact assessment, see **Chapter 6, Section 6.1.4.10 of the EIS, and Annex 17 of Addendum 1.**

Remark N° 61

Transmission lines

Under Article 10 of Law 19,300: Projects or activities that may cause an environmental impact, during any of their phases, and which are subject to the environmental impact evaluation system, are as follows:

- a) High voltage electricity transmission lines and associated substations.
- b) The EIS prepared by Gener makes no mention whatsoever of the impact to be caused by the temporary high voltage electricity lines that will run from Route G-25 to the encampment located in the La Engorda Valley, or the permanent lines that will run from Route G-25 to each of the intakes located in that Valley.

The study is not complete.

Thematic responses

ELE Electrical Installations

The electrical installations presented in the EIS comprise the substation, to be located in the El Sauce area, the characteristics of which are to be found in **Annex 27 of the EIS**; given that the electricity transport layout (cabling and towers) is to be presented to the Environmental Impact Assessment System once all background information is available.

ELE.03 Transmission lines

In view of the project's location, close to Santiago, it is expected that the distance covered by the definitive cabling layout will be short, involving a minimum of sectors not subject to prior intervention. With regard to the specific location of the cabling layout, plans call for the use of the existing high tension power line used by the Queltehues, Volcán, and Maitenes Plants.

Once the layout of the high tension power line has been defined, the Project Owner will submit this plan to the Environmental Impact Assessment System, in accordance with legislation in force. In line with the development of the Compliance Plan for environmental legislation applicable to the Project, the General Regulations applicable in this instance are indicated below:

Decree with Force of Law N°4, dated 05 February, 2007, setting forth the Recast, Coordinated, and Systematized Text of the General Law on Electrical Services.

The General Law on Electrical Services governs the generation, transmission, distribution, and regimen of concessions and tariffs applicable to electrical energy, and the functions of the State with regard to these areas.

Supreme Decree N° 327, Regulations Regarding the General Law on Electrical Services

The Regulations Regarding the General Law on Electrical Services establish, in their 8th Article, that hydroelectric power plants, electrical substations, and transmission lines may be installed without making a request for a concession, when the interested party wishes. These concessions may be provisional (in order to study projects) or definitive. A definitive concession is granted by a supreme decree issued by the Ministry of the Economy, by order of the President of the Republic. Permits relating to electrical installations that do not require concessions are granted by the corresponding Municipal Governments.

For further information and analysis on the aforementioned regulations, with regard to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see **Sections 3.1.6 and 3.1.7 of Chapter 3 of the EIS**, where more detailed versions of this information can be found.

Remark N° 62 Legal Framework, Actions to be Taken to Comply with Regulations in Force

During the evaluation of the possible environmental impact that would arise through the implementation of the Project, it is necessary to bear in mind the legal framework in which it will exist, and which affects the area where construction is to take place. The relevant legislation is:

Ministry of Mining Supreme Decree 78, which declares the area of the Cajón del Maipo as an "area of scientific interest for mining purposes", including statements that:

"... The area is found to be a natural biodiversity reserve of international interest, and it provides significant ecosystem services to the Metropolitan Region, such as the storage and supply of fresh water for irrigation and human consumption. It also forms part of an area of interest for tourism and cultural interests, making possible environmental education and with scientific potential, as well as cultural and archeological riches. Thirdly, the real protection of this area will permit proof of compliance with Free Trade Agreements, and will constitute compliance with international cooperation requirements".

The area is also protected under the Andean Santiago Action Plan, which declares the Cajón del Maipo as a "priority site for biodiversity conservation". This resolution underpins COREMA's commitment to treating the Cajón del Maipo valley as a protection priority.

Considering that these two documents clearly espouse the State's commitment to the protection of this area, as its protection even permits accreditation and compliance with Free Trade Agreements, meaning that any disaster that might occur would affect not only the area itself but also would probably harm international relations, in terms of both trade and other areas.

Weighted consideration must therefore be given to the potential dangers that could affect the country through non-compliance with this commitment - dangers that could affect the economic, environmental, social, cultural, and political spheres. The Environmental Impact Study includes some of these aspects, but this point should be analyzed in greater depth, and evaluating all potential consequences.

Similarly, the actions that AES Gener plans to take in order to comply fully with the aforementioned legal requirements should be explained.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

AGU.01 Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum**.

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**F&F Biodiversity Impact
Flora and Fauna**

The study conducted found evidence of the presence of 258 species of

plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.01 Regulations

The Project Owner shall comply with all legal environmental and sector-based regulations and requirements in force and applicable to the Project during the different phases of its development. The Project Owner has guaranteed compliance with the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and compliance with sector environmental permits.

Environmental regulations that apply to the Project have been identified based on its activities' potential environmental impacts affecting flora and fauna.

The full extent of these regulations is included in **Chapters 3 and 4 of the EIS, and in Section 2, Question 1 in Addendum 1.**

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1)

Chapter 3 of the EIS provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

Remark N° 63 Social and Environmental Impact

Impacts associated with the abstraction of large quantities of water must be evaluated in environmental terms and in terms of biodiversity.

The Environmental Impact Study should be expanded to include consideration of the social and environmental effects currently clearly shown in the different areas of the Cajón del Maipo Valley, and the predicted situation with the Project in operation during different seasons of the year. It is not sufficient simply to show numbers; this material should include photographs that clearly show the predicted situation with and without the Project's effects on flow rates in, for example, the Volcán River, the Colorado River, and the Maipo River, in different parts of the valley.

One effect that may be of use as an example is that, considering the predicted summer flow levels, it will be possible for persons and animals to cross the rivers by wading. Certain areas bordering the rivers currently use them as natural boundaries. In order to mitigate this situation and prevent passage on foot, consideration should be given to installing fencing along the full extent of the riverbanks, which would have an enormous effect downstream of the Project, in almost all of the Cajón del Maipo Valley - let alone the costs that AES Gener would have to bear.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water

quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality).

Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	Stream gauge station		6,259,100
	406,157		
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

F&F Biodiversity Impact Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the

work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfa, Aucayes, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions.

The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS**.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

Remark N° 64

Siting, Tunnel Access, Encampments, Muck Disposal Heaps, and Intakes in the El Morado Area (Upper Volcán River)

Figure 2.2.1.2, from Chapter 2 of the EIS.

As shown in the figure, the location of the tunnel access, El Morado Stream Intake, Las Placas Stream Intake, Colina Stream Intake, La Engorda Stream Intake, and the site of Muck Disposal Heap 1, along with the corresponding encampment, together form an area of five (5) square kilometers where the construction activities and permanent operations of AES Gener will be located.

This area is crossed by a dirt road that has been in existence for years, and which is currently used by tourists traveling to the El Morado Glacier and El Morado Lake, a site of natural beauty and a tourist attracting that brings in many visitors, both Chilean and foreign.

This track is also used by mountain climbers, who engage in a variety of sports and training activities in the Mesoncito Valley and the Morado, Rubilla, Unión, Punta Italia, Punta Chile, Yamakawa, Mesón Alto, and Loma Larga mountains, as well as other nearby peaks.

AES Gener must clearly indicate the actions that it will take (if these installations are built) to allow these tourists to retain current conditions of free and zero-cost access - which is normally conducted on foot or on horseback, without requesting any permits of any kind from any institution or similar, without barriers or rangers requesting identification.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services

related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **TUR Tourism**

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in

Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayes, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions. The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS**.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

VIA.04 Damage to roads and trails

The level of intervention to be generated by the Project was determined based on levels of saturation and deterioration of service levels, arising as a result of vehicle traffic caused by the Project - this Project highway impact analysis therefore did not take into account wear and tear on the road surface, as this parameter is not relevant when truck traffic complies with weight limits established by the Ministry of Public Works' Highways Department. In this regard, the Project Owner will permanently supervise weight control, in order to ensure compliance with the stipulations made in Ministry Public Works Supreme Decree 158/1980 which establishes gross weight limits for highways, as well as Decree 200, dated July 1993 and Decree 396, dated November 1993, establishing gross weight limits for urban streets. In both cases vehicle weight may not exceed 45 tons. For more information on measures planned by the Project Owner to ensure compliance with these regulations, see specific information in **Chapter 3 of the EIS**.

Furthermore, the Project Owner plans to undertake the conservation of Route G-25 (El Volcán area) and Route G-455 to the El Yeso Reservoir. Details of the current condition of each of these routes and planned road conservation measures, see the Road Improvement Program, in **Annex 19** of the EIS.

Finally, in advance of the start of road conservation activities, the corresponding Projects were approved by the Santiago Metropolitan Region Regional Highways Department. With regard to areas of interest for tourism, the conservation of part of the highway network and year-round maintenance of the more remote stretches of Route G-455 to El Yeso and Route G-25 from El Yeso Bridge to the El Volcán area will improve accessibility, favoring an increase in influx of visitors or the arrival of visitors over lengthier periods of the year, as these areas are largely inaccessible to tourists for a significant part of the winter season.

VIA.05 Free transit

The PHAM shall not interrupt access by mountain climbers, hikers, or permanent or sporadic visitors who enter the area for leisure, sports, cultural activities, etc. For safety reasons, the PHAM will restrict access only to its installations and work sites. Similarly, there will be no restrictions on access to properties owned by third parties and used for livestock grazing; in other words, usage conditions in summer and winter grazing areas have always been subject to agreements between livestock herders and landowners, and this situation will not be modified by the Project.

Remark N° 65 Water Rights

The EIS should contain information on rights to all water to be diverted; these rights should be duly registered in the name of AES Gener, or supplemented with title deeds and assignment documentation covering the quantity of water described in the EIS.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

Management Plan that contributes to the neutralization of certain existing environmental liabilities.

AGU.04.04 Monitoring and control of flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility

(Addendum, Section 5, Question 2).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility

(Addendum, Section 5, Question 2).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	406,157		Stream gauge station
	La Engorda Stream Bridge		6,259,100
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 67 Determination of Ecological Flow Rates

Summer ecological flow rates (minimum annual flow rate) must be determined on a periodic basis by the Directorate General of Water (DGA), not by the Project Owner.

An ongoing study running over several years is necessary in order to determine ecological flow rates, taking into account variables such as rainfall patterns and seasonality of river flow; this study must be approved by the DGA.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs,

zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 68 Volcán River Water Abstraction

On page 3, paragraph 1 of the executive summary, it is stated that eleven (11) m³/s of water will be abstracted from the tributaries of the Volcán River (Engorda, Colina, Las Placas, and El Morado Streams); this could lead to enormous problems for the area, given that during at least eight (8) months of the year the average flow rate in the Volcán River, according to data obtained from the Directorate General of Water (DGA), is indicated to be close to ten (10) m³/s.

The EIS released by AES Gener ought to take into account the fact that this mountain river exhibits a variable flow regime, and the abstraction of a quantity greater than the quantity of water supplied by its tributaries from which it is captured would be completely unfeasible and dangerous, not only for the community and the environment but also for the Project itself.

This also indicates a lack of due attention to detail in the preparation of the EIS.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

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It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications

in the natural state of the hydrological system relate to the presence of the Alfafal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of

Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.02 EIS Additional and Complementary Information

In accordance with consultation procedures conducted by oversight services, further studies and information have been incorporated into Addendum 1, which complements existing information provided in the EIS. Regarding ecological flow rates (**Annex 17**), cultural heritage (**Annex 14**) and the management of summer grazing areas (**Annex 6**).

Remark N° 69 Future of the Works

In particular, the EIS should indicate what will be the fate of the tunnel and abstraction intakes after the 20 year lifespan of the Project has ended, this being the maximum reasonable time frame in view of the decline shown in the region - as can be verified in the abandonment of a number of lines (verify with Andacor and others). The EIS presents no reference to this situation or evaluation, showing a lack of rigor and concern for the future of the Project.

The Proyecto Hidroeléctrico Alto Maipo EIS should at the very least conduct all necessary studies at its own expense, over and above the general information contained in the EIS, presenting the results with proposals for the situation of replacing the Project's technologies with other systems that cause less damage to the physical and social environment. These conditions are required by communities in the area, and were specified and requested in a timely manner.

Thematic responses

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

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Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

PRO.03.01 Intakes

The Alto Maipo Hydroelectric Project (PHAM) plans to capture water resources at eight different points. The Project holds in-stream water rights at each of these points, and the concessions granting rights at most of these points include ecological flow rate stipulations issued by the Directorate General of Water (DGA).

The water intake points are as follows:

For the Alfalfal II Plant: the El Morado Stream, the La Engorda Stream, the Colina Stream, the Las Placas Creek, and the Yeso River. For the Las Lajas Plant: the Alfalfal Plant discharge, and the Colorado River at the Maitenes Intake. For a detailed description of planned installations, see Chapter 2, Section 2.2.2 of the EIS, and attached Annexes 1 and 8.

See Annex 12 of the EIS for a map of intakes in the PHAM area of influence. See Table 2.2.2, in Chapter 2 of the EIS, for the characteristics and descriptions of the intake installation.

For information on the Project's impact on water quality in the area's watercourses arising as a result of the construction of intakes, see Section I, Question 3 in the Addendum.

For the intake maintenance plan, the Chapter 2, Section 2.2.2 of the EIS, and additional information provided in Section I, Question 11 of the Addendum.

For clarifications regarding the El Yeso Reservoir, see Section I, question 27 in the Addendum.

For details on the construction methods and the mitigation and compensation measures planned by the Project to address the environmental impact of the intakes, see Annex 6 of the

Addendum.

PRO.03.02 Tunnels

The majority of the Project is planned for installation underground. The general characteristics of the tunnels are described in Chapter 2 of the EIS, Table 2.2.5 (for detailed geological information on the path taken by the tunnels, see Annex 46 of the EIS).

For an evaluation of the impact and environmental management measures associated with underground installations, see Chapter 6 of the EIS.

Annex 45 of the EIS, Hydro-Geology of Underground Works, presents a general description of the geological conditions that are expected to be found along the lengths of the tunnels; expected permeability based on geological knowledge and hydro-geological conditions in the area, incorporating experience gained during the construction of tunnels for the Alfalfa Plant, which has been operative for more than 17 years; as well as a description that includes the design of the tunnels, providing a brief explanation of the methods to be used to reduce and control water seepage.

With regard to the impact of the path taken by the tunnel passing underneath the El Morado Natural Monument, and measures to be taken to respect the area, see Section I, Responses 4, 5, and 6, in the Addendum.

Remark N° 70 Intakes - Visual Impact

The site where the intakes are to be installed in the tributaries of the Volcán River is widely visited in winter and in summer, with over 20 thousand Chileans and foreign nationals visiting each year to marvel at the area's scenic beauty.

In view of this situation, the visual impact of the channels and intakes that draw water into the tunnels should be established.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit

the more remote parts of the Project area, reducing

- emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **TUR Tourism Scenery**

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

TUR.03 Visual impact

The Project is to be located, taking into account esthetic and perceptual considerations and emphasizing the characterization and appraisal of the issues of visibility, quality, and visual fragility of the landscape.

In terms of Landscape Alteration or Landscape Impact associated with this infrastructure project, potential effects are classified as either limited duration - generally applying during the construction phase - or permanent, for effects that shall persist during the operations phase and continue throughout the working life of the Project. A qualitative methodology is used to study these effects, whereby the first phase consists of identifying sources of visual Impact, and the second phase relates to identifying and classifying environmental impacts.

As a general rule, it is assumed that impact on the landscape during the construction phase shall be temporary, mainly due to the transitory nature of the sources of impact, the low level of prior human activity in certain areas, and the relatively low level of physical and visual accessibility of a significant proportion of the area subject to intervention.

As most of the Project construction works will be situated underground, during the operations phase the main visual signatures of its existence will be the intakes and access roads.

For further information on the methodology used for landscape impact assessment, see **Chapter 6, Section 6.1.4.10 of the EIS, and Annex 17 of Addendum 1.**

Remark N° 71 Muck Disposal Heaps

The sites where rock material produced through tunnel excavation will be disposed of in heaps should be specified definitively. In view of existing laws protecting the areas, these sites should not be located in the Cajón del Maipo Valley.

Thematic responses

MAR Muck

The PHAM plans to construct approximately 70 km of tunnels. The excavation of these tunnels will generate inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of inert material produced in road building and the construction of buried conduits.

This muck material will be deposited in the 14 muck disposal heaps that the Project plans to create. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria. For more information, please see **Annex 6 of the EIS** and **Annex 3 of the Addendum**.

MAR.01 Regulations

The Project Owner has made available a Management Plan for "Project Muck Disposal Heaps", which contains information on the technical, environmental, and safety specifications of the heaps, as well as recommendations contained in the Ministry of Public Works' 2004 Environmental Management Plan Manual for Works Subject to Concessions. In particular, the Plan establishes the environmental considerations adopted for the operation of the muck disposal heaps, to be implemented during the construction of tunnels and roads under the PHAM.

In order to comply with the environmental management measures contained in the EIS, an Environmental Monitoring Program will be conducted, with the aim of verifying the effectiveness of these measures and compliance with them. For details on the principal actions included in the Monitoring Program, and for the various stages of functionality of the muck disposal sites, see **Annex 6 of the EIS** and **Annex 3 of Addendum 1**.

For more information on the specific regulations applicable to the Project, and compliance therewith, see **Chapter 3 of the EIS**.

MAR.02 Location

The PHAM calls for the creation of 14 muck disposal heaps, for the disposal of waste material from tunnel boring and smaller quantities of inert waste from the construction of roads and buried conduits. Maps of the muck disposal heaps, and a copy of the muck disposal heap management plan, are included in Annex 6 of the Project EIS.

For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria.

From a technical and safety perspective, the muck disposal heap sites have been located as close as possible to exit points from tunnels and to surface work sites, in areas not at risk to landslides or landslip events.

The following aspects have been taken into account as environmental criteria in site selection:

Sites have been selected that are distant from any settlements or any housing used on a permanent or temporary basis.

Priority has been given to selecting sites with low visual impact - that is, in areas that are distant from potential observation points on public highways or high ground.

In the Project area's higher elevation regions, the disposal heaps have been sited up against natural topological features, such that the emplacement of the heaps' layers forms a continuation of the general landform structures of the area.

In general these are areas that are of low value as a habitat for plant life (soils with usage capacity ratings V, VI, and VII), and efforts have been made to avoid modifications to the original land form structures present or to surface watercourses.

Surface surveys have been conducted in all of these regions, as details in **Section 5.8, in Chapter 5 of the EIS**, to rule out the presence of sites of archeological and/or paleontological value at the muck disposal heap sites.

For more information, see **Annex 6 of the EIS** and **Annex 3 of Addendum 1**.

MAR.03 Characteristics

The material to be deposited in the muck disposal heaps will be inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of waste material produced in road building and the construction of buried conduits. It is expected that a total of 1.7 m cubic meters of TBM muck will be produced.

The total volume of material to be disposed of is estimated at 2.7 m cubic meters, including uncompacted rock and soil; this material will be disposed of at the 14 muck disposal heap sites planned under the PHAM. Maps of the muck disposal heaps, and a copy of the muck disposal heap management plan, are included in Annex 6 of the EIS.

The waste material produced through tunnel excavation, road building, and construction of buried

conduits during the construction phase will be deposited in a series of layers forming terraces. The muck disposal heaps will be built up in an organized manner, forming level and safe

platforms, with slopes at the sides with the natural gradient formed by the material in question, thus ensuring stability and permitting adequate drainage. All of these design features are in conformity with the muck disposal heap construction method and environmental measures indicated in **Section 4.2 of Annex 6 of the EIS, and Annex 3 of Addendum 1**.

Finally, the filling will be covered with 20 cm of organic soil, permitting the definitive finishing of the spoil heap.

Management and restoration techniques for the 14 muck disposal heaps are indicated in Annex 29, "Restoration Plan", which includes information on surface treatments.

MAR.04 Impact

All of the measures adopted for the creation, operation, and abandonment of the muck disposal heaps will be implemented by the Works Contractor. Gener will undertake an environmental monitoring plan addressing the management and usage of the sites, which will include site inspections and periodic review of site entry records.

Rainwater will be managed using specially designed channeling works, the details of each of which are indicated in the plans attached in Annex 6 of the EIS.

The Project Owner's reiterates its commitment to undertake an exhaustive program to rescue low mobility fauna in the area of direct influence of PHAM works (including the area to be occupied by the 14 sites where muck, spoil, and earth will be disposed of in heaps). This wildlife rescue will require the application of capture techniques suitable for small mammals, reptiles, and amphibians. **Annex 4 of Addendum 1** presents the Wildlife Rescue and Relocation Plan.

Even following surveys ruling out the presence of archeological or paleontological sites or finds in the muck disposal heap sites, the PHAM also includes a series of measures designed to prevent any intervention in sites with heritage value, with the implementation of restricted areas and training programs for contractor personnel. For more information, see **Annex 14 of Addendum 1 and Annex 33 of the EIS, "Restricted areas"**.

MAR.05 Composition and Hazardousness

Although the waste material produced from tunneling activities will be inert - in the construction of tunnels for the Alfalfa Plant, where 35 km of tunnels were excavated, no evidence was found of material that could lead to acidic or basic drainage in contact with rainwater - the PHAM includes a management plan applicable to water that may be produced from contact between muck or waste rock and rainwater or snow. For further details, see Annex 6 of the EIS.

The Project Owner plans to take measurements to assess the possibility of acidic drainage at the muck disposal heap sites, as indicated in **Annex 6, Section 5 in the EIS and Response 10 in Section 9 of Addendum 1**. The actions will form part of the Environmental Monitoring Plan, and will be preventive rather than response actions.

Remark N° 72 Muck disposal heaps - Details

The final disposal of the muck and waste rock produced should be clearly specified, providing detailed information on each of the planned heaps, featuring figures, graphics, and photographs showing where each heap will be sited and explaining its final visual impact.

Thematic responses

MAR Muck

The PHAM plans to construct approximately 70 km of tunnels. The excavation of these tunnels will generate inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of inert material produced in road building and the construction of buried conduits.

This muck material will be deposited in the 14 muck disposal heaps that the Project plans to create. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria. For more information, please see **Annex 6 of the EIS** and **Annex 3 of the Addendum**.

MAR.02 Location

The PHAM calls for the creation of 14 muck disposal heaps, for the disposal of waste material from tunnel boring and smaller quantities of inert waste from the construction of roads and buried conduits. Maps of the muck disposal heaps, and a copy of the muck disposal heap management plan, are included in Annex 6 of the Project EIS.

For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria.

From a technical and safety perspective, the muck disposal heap sites have been located as close as possible to exit points from tunnels and to surface work sites, in areas not at risk to landslides or landslip events.

The following aspects have been taken into account as environmental criteria in site selection:

Sites have been selected that are distant from any settlements or any housing used on a permanent or temporary basis.

Priority has been given to selecting sites with low visual impact - that is, in areas that are distant from potential observation points on public highways or high ground.

In the Project area's higher elevation regions, the disposal heaps have been sited up against natural topological features, such that the emplacement of the heaps' layers forms a continuation of the general landform structures of the area.

In general these are areas that are of low value as a habitat for plant life (soils with usage capacity ratings V, VI, and VII), and efforts have been made to avoid modifications to the original land form structures present or to surface watercourses.

Surface surveys have been conducted in all of these regions, as details in **Section 5.8, in Chapter 5 of the EIS**, to rule out the presence of sites of archeological and/or paleontological value at the muck disposal heap sites.

For more information, see **Annex 6 of the EIS** and **Annex 3 of Addendum 1**.

Remark N° 73 Muck disposal heaps - Capacity

The capacity of each muck disposal heap, and the source, composition, and quantity of material to be deposited in it, should be specified. The muck disposal heaps shown in the diagrams do not seem to be sufficient to receive the quantity of muck that will be generated, estimated at 1,400,000 m³.

Thematic responses

MAR Muck

The PHAM plans to construct approximately 70 km of tunnels. The excavation of these tunnels will generate inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of inert material produced in road building and the construction of buried conduits.

This muck material will be deposited in the 14 muck disposal heaps that the Project plans to create. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria. For more information, please see **Annex 6 of the EIS** and **Annex 3 of the Addendum**.

MAR.03 Characteristics

The material to be deposited in the muck disposal heaps will be inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of waste material produced in road building and the construction of buried conduits. It is expected that a total of 1.7 m cubic meters of TBM muck will be produced.

The total volume of material to be disposed of is estimated at 2.7 m cubic meters, including uncompacted rock and soil; this material will be disposed of at the 14 muck disposal heap sites planned under the PHAM. Maps of the muck disposal heaps, and a copy of the muck disposal heap management plan, are included in Annex 6 of the EIS.

The waste material produced through tunnel excavation, road building, and construction of buried conduits during the construction phase will be deposited in a series of layers forming terraces. The muck disposal heaps will be built up in an organized manner, forming level and safe platforms, with slopes at the sides with the natural gradient formed by the material in question, thus ensuring stability and permitting adequate drainage. All of these design features are in conformity with the muck disposal heap construction method and environmental measures indicated in **Section 4.2 of Annex 6 of the EIS, and Annex 3 of Addendum 1**.

Finally, the filling will be covered with 20 cm of organic soil, permitting the definitive finishing of the spoil heap.

Management and restoration techniques for the 14 muck disposal heaps are indicated in Annex 29, "Restoration Plan", which includes information on surface treatments.

MAR.05 Composition and Hazardousness

Although the waste material produced from tunneling activities will be inert - in the construction of tunnels for the Alfalfa Plant, where 35 km of tunnels were excavated, no evidence was found of material that could lead to acidic or basic drainage in contact with rainwater - the PHAM includes a management plan applicable to water that may be produced from contact between muck or waste rock and rainwater or snow. For further details, see Annex 6 of the EIS.

The Project Owner plans to take measurements to assess the possibility of acidic drainage at the muck disposal heap sites, as indicated in **Annex 6, Section 5 in the EIS** and **Response 10 in Section 9 of Addendum 1**. The actions will form part of the Environmental Monitoring Plan, and will be preventive rather than response actions.

Remark N° 74 Muck disposal heaps - Access

Additionally, if the muck disposal heaps are located in areas of scenic or tourism interest, access conditions during the construction period must be specifically stated.

The current situation - free access with no requirement to request authorizations, no barriers, and no guards requesting identification - should not be altered.

Thematic responses

MAR Muck

The PHAM plans to construct approximately 70 km of tunnels. The excavation of these tunnels will generate inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of inert material produced in road building and the construction of buried conduits.

This muck material will be deposited in the 14 muck disposal heaps that the Project plans to create. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria. For more information, please see **Annex 6 of the EIS** and **Annex 3 of the Addendum**.

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayes, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions.

The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS**.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

VIA.05 Free transit

The PHAM shall not interrupt access by mountain climbers, hikers, or permanent or sporadic

visitors who enter the area for leisure, sports, cultural activities, etc. For safety reasons, the PHAM will restrict access only to its installations and work sites. Similarly, there will be no restrictions on access to properties owned by third parties and used for livestock grazing; in other words, usage conditions in summer and winter grazing areas have always been subject to agreements between livestock herders and landowners, and this situation will not be modified by the Project.

Remark N° 75 Muck disposal heaps - Visual Impact

In Chapter 2, page 10, it is stated that the muck disposal heap sites constitute land that will be occupied on a permanent basis.

In order to prevent the generation of a major visual impact and heavy metal contamination that could leach into the environment from tunneling works, these sites should be restored once construction has been completed, and material deposited at an authorized site.

Thematic responses

MAR Muck

The PHAM plans to construct approximately 70 km of tunnels. The excavation of these tunnels will generate inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of inert material produced in road building and the construction of buried conduits.

This muck material will be deposited in the 14 muck disposal heaps that the Project plans to create. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria. For more information, please see **Annex 6 of the EIS** and **Annex 3 of the Addendum**.

MAR.01 Regulations

The Project Owner has made available a Management Plan for "Project Muck Disposal Heaps", which contains information on the technical, environmental, and safety specifications of the heaps, as well as recommendations contained in the Ministry of Public Works' 2004 Environmental Management Plan Manual for Works Subject to Concessions. In particular, the Plan establishes the environmental considerations adopted for the operation of the muck disposal heaps, to be implemented during the construction of tunnels and roads under the PHAM.

In order to comply with the environmental management measures contained in the EIS, an Environmental Monitoring Program will be conducted, with the aim of verifying the effectiveness of these measures and compliance with them. For details on the principal actions included in the Monitoring Program, and for the various stages of functionality of the muck disposal sites, see **Annex 6 of the EIS** and **Annex 3 of Addendum 1**.

For more information on the specific regulations applicable to the Project, and compliance therewith, see **Chapter 3 of the EIS**.

MAR.04 Impact

All of the measures adopted for the creation, operation, and abandonment of the muck disposal heaps will be implemented by the Works Contractor. Gener will undertake an environmental monitoring plan addressing the management and usage of the sites, which will include site inspections and periodic review of site entry records.

Rainwater will be managed using specially designed channeling works, the details of each of which are indicated in the plans attached in Annex 6 of the EIS.

The Project Owner's reiterates its commitment to undertake an exhaustive program to rescue low mobility fauna in the area of direct influence of PHAM works (including the area to be occupied by the 14 sites where muck, spoil, and earth will be disposed of in heaps). This wildlife rescue will require the application of capture techniques suitable for small mammals, reptiles, and amphibians. **Annex 4 of Addendum 1** presents the Wildlife Rescue and Relocation Plan.

Even following surveys ruling out the presence of archeological or paleontological sites or finds in the muck disposal heap sites, the PHAM also includes a series of measures designed to prevent any intervention in sites with heritage value, with the implementation of restricted areas and training programs for contractor personnel. For more information, see **Annex 14 of Addendum 1 and Annex 33 of the EIS**, "Restricted areas".

MAR.05 Composition and Hazardousness

Although the waste material produced from tunneling activities will be inert - in the construction of tunnels for the Alfalfa Plant, where 35 km of tunnels were excavated, no evidence was found of material that could lead to acidic or basic drainage in contact with rainwater - the PHAM includes a management plan applicable to water that may be produced from contact between muck or waste rock and rainwater or snow. For further details, see Annex 6 of the EIS.

The Project Owner plans to take measurements to assess the possibility of acidic drainage at the muck disposal heap sites, as indicated in **Annex 6, Section 5 in the EIS** and **Response 10 in Section 9 of Addendum 1**. The actions will form part of the Environmental Monitoring Plan, and will be preventive rather than response actions.

Remark N° 76 Muck disposal heap - water pollution

The Environmental Impact Study should consider the risk that, during the springtime snow melt, runoff water may be contaminated with the minerals that may be present in the waste material deposited in the heaps. To date, no empirical knowledge exists regarding what minerals may be present.

Thematic responses

MAR Muck

The PHAM plans to construct approximately 70 km of tunnels. The excavation of these tunnels will generate inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of inert material produced in road building and the construction of buried conduits.

This muck material will be deposited in the 14 muck disposal heaps that the Project plans to create. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria. For more information, please see **Annex 6 of the EIS** and **Annex 3 of the Addendum**.

MAR.04 Impact

All of the measures adopted for the creation, operation, and abandonment of the muck disposal heaps will be implemented by the Works Contractor. Gener will undertake an environmental monitoring plan addressing the management and usage of the sites, which will include site inspections and periodic review of site entry records.

Rainwater will be managed using specially designed channeling works, the details of each of which are indicated in the plans attached in Annex 6 of the EIS.

The Project Owner's reiterates its commitment to undertake an exhaustive program to rescue low mobility fauna in the area of direct influence of PHAM works (including the area to be occupied by the 14 sites where muck, spoil, and earth will be disposed of in heaps). This wildlife rescue will require the application of capture techniques suitable for small mammals, reptiles, and amphibians. **Annex 4 of Addendum 1** presents the Wildlife Rescue and Relocation Plan.

Even following surveys ruling out the presence of archeological or paleontological sites or finds in the muck disposal heap sites, the PHAM also includes a series of measures designed to prevent any intervention in sites with heritage value, with the implementation of restricted areas and training programs for contractor personnel. For more information, see **Annex 14 of Addendum 1 and Annex 33 of the EIS**, "Restricted areas".

MAR.05 Composition and Hazardousness

Although the waste material produced from tunneling activities will be inert - in the construction of tunnels for the Alfalfa Plant, where 35 km of tunnels were excavated, no evidence was found of material that could lead to acidic or basic drainage in contact with rainwater - the PHAM includes a management plan applicable to water that may be produced from contact between muck or waste rock and rainwater or snow. For further details, see Annex 6 of the EIS.

The Project Owner plans to take measurements to assess the possibility of acidic drainage at the muck disposal heap sites, as indicated in **Annex 6, Section 5 in the EIS** and **Response 10 in Section 9 of Addendum 1**. The actions will form part of the Environmental Monitoring Plan, and will be preventive rather than response actions.

Remark N° 77 El Volcán - Visual Impact

In Chapter 2, page 39, it is stated that:

"Priority has been given to selecting sites with low visual impact - that is, in areas that are distant from potential observation points on public highways or high ground."

Figure 2.2.1.2 indicates that the muck disposal heap pertaining to the El Volcán will be located well within the Valle de las Arenas, in a site that is fully visible from the road to Baños Colina and from the hiking trail to Volcán San José and the Mesoncito Valley - all located at high elevations. A public track also passes through the area.

Thematic responses

MAR Muck

The PHAM plans to construct approximately 70 km of tunnels. The excavation of these tunnels will generate inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of inert material produced in road building and the construction of buried conduits.

This muck material will be deposited in the 14 muck disposal heaps that the Project plans to create. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria. For more information, please see **Annex 6 of the EIS** and **Annex 3 of the Addendum**.

MAR.02 Location

The PHAM calls for the creation of 14 muck disposal heaps, for the disposal of waste material from tunnel boring and smaller quantities of inert waste from the construction of roads and buried conduits. Maps of the muck disposal heaps, and a copy of the muck disposal heap management plan, are included in Annex 6 of the Project EIS.

For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria.

From a technical and safety perspective, the muck disposal heap sites have been located as close as possible to exit points from tunnels and to surface work sites, in areas not at risk to landslides or landslip events.

The following aspects have been taken into account as environmental criteria in site selection:

Sites have been selected that are distant from any settlements or any housing used on a permanent or temporary basis.

Priority has been given to selecting sites with low visual impact - that is, in areas that are distant from potential observation points on public highways or high ground.

In the Project area's higher elevation regions, the disposal heaps have been sited up against natural topological features, such that the emplacement of the heaps' layers forms a continuation of the general landform structures of the area.

In general these are areas that are of low value as a habitat for plant life (soils with usage capacity ratings V, VI, and VII), and efforts have been made to avoid modifications to the original land form structures present or to surface watercourses.

Surface surveys have been conducted in all of these regions, as details in **Section 5.8, in Chapter 5 of the EIS**, to rule out the presence of sites of archeological and/or paleontological value at the muck disposal heap sites.

For more information, see **Annex 6 of the EIS** and **Annex 3 of Addendum 1**.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

TUR Tourism

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in

a modification in level of

natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.03 Visual impact

The Project is to be located, taking into account esthetic and perceptual considerations and emphasizing the characterization and appraisal of the issues of visibility, quality, and visual fragility of the landscape.

In terms of Landscape Alteration or Landscape Impact associated with this infrastructure project, potential effects are classified as either limited duration - generally applying during the construction phase - or permanent, for effects that shall persist during the operations phase and continue throughout the working life of the Project. A qualitative methodology is used to study these effects, whereby the first phase consists of identifying sources of visual impact, and the second phase relates to identifying and classifying environmental impacts.

As a general rule, it is assumed that impact on the landscape during the construction phase shall be temporary, mainly due to the transitory nature of the sources of impact, the low level of prior human activity in certain areas, and the relatively low level of physical and visual accessibility of a significant proportion of the area subject to intervention.

As most of the Project construction works will be situated underground, during the operations phase the main visual signatures of its existence will be the intakes and access roads.

For further information on the methodology used for landscape impact assessment, see **Chapter 6, Section 6.1.4.10 of the EIS, and Annex 17 of Addendum 1**.

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**.

The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.05 Free transit

The PHAM shall not interrupt access by mountain climbers, hikers, or permanent or sporadic visitors who enter the area for leisure, sports, cultural activities, etc. For safety reasons, the PHAM will restrict access only to its installations and work sites.

Similarly, there will be no restrictions on access to properties owned by third parties and used for livestock grazing; in other words, usage conditions in summer and winter grazing areas have always been subject to agreements between livestock herders and landowners, and this situation will not be modified by the Project.

Remark N° 78 Tunnels - Visual Impact

The visual impact caused by the work sites for the different tunnels to be built should be clearly specified.

Thematic responses

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

PRO.03.02 Tunnels

The majority of the Project is planned for installation underground. The general characteristics of the tunnels are described in Chapter 2 of the EIS, Table 2.2.5 (for detailed geological information on the path taken by the tunnels, see Annex 46 of the EIS).

For an evaluation of the impact and environmental management measures associated with underground installations, see Chapter 6 of the EIS.

Annex 45 of the EIS, Hydro-Geology of Underground Works, presents a general description of the geological conditions that are expected to be found along the lengths of the tunnels; expected permeability based on geological knowledge and hydro-geological conditions in the area, incorporating experience gained during the construction of tunnels for the Alfalfal Plant, which has been operative for more than 17 years; as well as a description that includes the design of the tunnels, providing a brief explanation of the methods to be used to reduce and control water seepage.

With regard to the impact of the path taken by the tunnel passing underneath the El Morado Natural Monument, and measures to be taken to respect the area, see Section I, Responses 4, 5, and 6, in the Addendum.

PRO.03.03 Encampments and Works Installations

For details on the creation of encampments and works installations, please see Chapter 2, Section 2.3.2.4 in the EIS.

For information on PHAM encampment and work site approach routes, see EIS, Chapter 2, Table 2.1.2,

For information on regulations, see Chapter 3 of the EIS and Annex 33, General Operating Regulations for Encampments and Work Sites.

For information on the management of waste produced at work sites and encampments, see Annex 18 of the EIS, "Site Installation Waste Management Plan".

For information on the discharge of treated wastewater, see Response 26 in the Addendum.

For information on human consumption of water at encampments and works installations, see Chapter 2, Section 2.3.2.4, parts b and i.

For an assessments of the impact of the creation of encampments and works installations, monitoring methods,

and conditions, see Chapter 6 of the EIS.

TUR Tourism

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.03 Visual impact

The Project is to be located, taking into account esthetic and perceptual considerations and emphasizing the characterization and appraisal of the issues of visibility, quality, and visual fragility of the landscape.

In terms of Landscape Alteration or Landscape Impact associated with this infrastructure project, potential effects are classified as either limited duration - generally applying during the construction phase - or permanent, for effects that shall persist during the operations phase and continue throughout the working life of the Project. A qualitative methodology is used to study these effects, whereby the first phase consists of identifying sources of visual impact, and the second phase relates to identifying and classifying environmental impacts.

As a general rule, it is assumed that impact on the landscape during the construction phase shall be temporary, mainly due to the transitory nature of the sources of impact, the low level of prior human activity in certain areas, and the relatively low level of physical and visual accessibility of a significant proportion of the area subject to intervention.

As most of the Project construction works will be situated underground, during the operations phase the main visual signatures of its existence will be the intakes and access roads.

For further information on the methodology used for landscape impact assessment, see **Chapter 6, Section 6.1.4.10 of the EIS, and Annex 17 of Addendum 1**.

Remark N° 79 Human Environment

In Chapter 5, point 5.5.2.5, on Basic Social Welfare Aspects, Page 48 D, it is stated that:
"All settlements in the Project's area of influence possess access to the natural environment. Indeed, a significant proportion of them are located in areas that feature almost untouched surroundings, and local residents therefore have extensive access to natural areas.

Key components of the area's natural environment include its watercourses and their valleys, as well as its mountain ranges. Similarly, although the area's highway infrastructure does not show high levels of development and is strongly affected by prevailing weather conditions, existing routes permit access to areas where the natural environment may be enjoyed. Nonetheless, hiking trails are of significant importance in the area, given that, together with their associated tourism infrastructure, they provide rapid and well-informed access to the local area's natural sites".

Attention should be drawn to the fact that their status as untouched areas draws in many Chilean and foreign tourists who come in search of country areas for relaxation and leisure; these areas are normally visited by people who are tired of being surrounded by tourism installations, as so often occurs in Europe, for example, where many tourist sites feature the presence of large, modern installations. For instance, it is normal to see groups of tourists camping out beside the Laguna del Morado Lake, and ice-climbing in the glacier above it; this is also a starting point for hiking trips and attempts on a number of nearby mountaintops.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;

- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **TUR Tourism**

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

TUR.03 Visual impact

The Project is to be located, taking into account esthetic and perceptual considerations and emphasizing the characterization and appraisal of the issues of visibility, quality, and visual fragility of the landscape.

In terms of Landscape Alteration or Landscape Impact associated with this infrastructure project, potential effects are classified as either limited duration - generally applying during the construction phase - or permanent, for effects that shall persist during the operations phase and continue throughout the working life of the Project. A qualitative methodology is used to study these effects, whereby the first phase consists of identifying sources of visual impact, and the second phase relates to identifying and classifying environmental impacts.

As a general rule, it is assumed that impact on the landscape during the construction phase shall be temporary, mainly due to the transitory nature of the sources of impact, the low level of prior human activity in certain areas, and the relatively low level of physical and visual accessibility of a significant proportion of the area subject to intervention.

As most of the Project construction works will be situated underground, during the operations phase the main visual signatures of its existence will be the intakes and access

roads. For further information on the methodology used for landscape impact assessment,

see **Chapter 6, Section 6.1.4.10 of the EIS, and Annex 17 of Addendum 1.**

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1.** The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS.**

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayas, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions. The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS.**

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

VIA.05 Free transit

The PHAM shall not interrupt access by mountain climbers, hikers, or permanent or sporadic visitors who enter the area for leisure, sports, cultural activities, etc. For safety reasons, the PHAM will restrict access only to its installations and work sites. Similarly, there will be no restrictions on access to properties owned by third parties and used for livestock grazing; in other words, usage conditions in summer and winter grazing areas have always been subject to agreements between livestock herders and landowners, and this situation will not be modified by the Project.

Remark N° 80 Tourism and Access Routes

It should be specified that both AES Gener and its contractors shall not be authorized to prohibit access for the purpose of visiting any area located close to the Projects work sites and installations, whether the visitor seeks to engage in scientific, cultural, or educational activities, leisure, sports, tourism, onward travel to another point, farming, livestock herding, or any other purpose, applying to Chileans citizens and foreigners.

Equally, there should be no barriers or guards who request identification or any other document or authorization for such access.

AES Gener should also take responsibility for the safety of those who directly enter its installations.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative,

that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **TUR Tourism Scenery**

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayes, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions. The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures,

see

Chapter 2, point 2.3.2.5 of the EIS.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

VIA.05 Free transit

The PHAM shall not interrupt access by mountain climbers, hikers, or permanent or sporadic visitors who enter the area for leisure, sports, cultural activities, etc. For safety reasons, the PHAM will restrict access only to its installations and work sites. Similarly, there will be no restrictions on access to properties owned by third parties and used for livestock grazing; in other words, usage conditions in summer and winter grazing areas have always been subject to agreements between livestock herders and landowners, and this situation will not be modified by the Project.

Remark N° 81

Human Environment - Activities around the Volcán River

In Chapter 5, page 5.5, on the HUMAN ENVIRONMENT: On page 5 of the baseline study, it is indicated that: *"Volcán River Valley: The settlements of El Romeral, El Volcán, Baños Morales, and Lo Valdés are located in this valley. These settlements depend on mining activity. Tourism has shown gradual growth as an economic activity in the district, principally in the settlements of Baños Morales and Lo Valdés. This is an area that attracts persons from different socio-economic groups, and those with special interests, including lower-middle socio-economic groups in the Metropolitan Region - who visit the popular Baños de Colina and the thermal springs at Baños Morales - as well as special interest groups such as Chilean and foreign mountain climbers frequenting Lo Valdés and the El Morado Sanctuary."*

The EIS does not mention that the areas that are most frequently visited by mountain climbers and by Chilean and foreign hikers also include the Valle de las Arenas, Mesoncito, El Morado, the Valle de la Engorda en route to the San José Volcano, and the Valle del Marmolejo en route to the Marmolejo Peak (see information on foreign visitors held by Difrol). Similarly, it does not indicate that the areas that are most accessible and that show growing tourism activity are the following sites:

The area known as "Choriboulder" located in the Valle de las Arenas (at which site plans call for the installation of an encampment and a muck disposal heap). This area is one of the country's most significant climbing sites for bouldering, and a starting point for visitors en route to other areas such as the Valle del Mesoncito, Laguna del Morado, the peaks known as Unión, Punta Italia, Punta Chile, Yamakawa, Mesón Alto for its south-east wall, Loma Larga, and many others. Evening gatherings of the climbing and mountaineering community are also held periodically at this site. The Laguna del Morado Lake, also known as "San Rafael de los Pobres" due to its scenic beauty that is reminiscent of the San Rafael Glacier but that can be visited more cheaply and easily from Santiago. This lake is fed by meltwater from the imposing El Morado Glacier, and it is a much-frequented site by not only Chileans but also foreigners, due to its spectacular vistas and easy, free access. This site is used by a number of institutions - including the National Mountain School, university mountaineering courses, and several mountain sports clubs - to give ice climbing and glacier mountaineering courses. This lake is not to be confused with the smaller Morales Lake, located inside the El Morado Natural Monument.

Cerro Marmolejo, a mountain with its summit at 6110 masl, accessed along the Marmolejo Valley. This is a particularly significant site in world tourism, being the planet's most southerly mountain of over six thousand meters - a feature that leads to global renown. It is also a vital site for Chilean mountaineering, as it is the most accessible peak of over six thousand meters in Central Chile, that can be climbed without bureaucratic obstacles.

The area features a number of less-visited mountain sites that are nonetheless of equal importance for tourism, such as the aforementioned Valle del Mesoncito, the peaks of Rubilla, Unión, Morado, Mesón Alto, Arenas, Punta Italia, Punta Chile, Moai, Yamakawa, Loma Larga, and the San José Volcano, among others.

These areas have potential not only in terms of tourism, but also for education: they are currently often used for mountaineering courses, training in camping techniques, winter survival, and ice climbing, rock climbing, and mixed climbing, leveraging their rapid and easy access. A range of educational institutions also use the area for field trips in courses on subjects such as ecotourism and geology.

These areas are visited not only during the summer season but also in the winter, when their beauty is all the more imposing and when they are similarly a key site for mountaineering training. Many of those who visit the Cajón del Maipo come in search of these untouched areas, helping support the tourism sector and contributing to the local economy.

If the implementation of this Project is implemented, AES Gener must offer a binding agreement that access to these areas (and to other areas not mentioned above) must continue to be free and open, with no requirement for permits or similar, and with no barriers or guards who request identification.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the

PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **TUR Tourism**

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected

to have no impact on tourism activities (see **Chapter 6.4 of the EIS**). Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:
Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.05 Free transit

The PHAM shall not interrupt access by mountain climbers, hikers, or permanent or sporadic visitors who enter the area for leisure, sports, cultural activities, etc. For safety reasons, the PHAM will restrict access only to its installations and work sites. Similarly, there will be no restrictions on access to properties owned by third parties and used for livestock grazing; in other words, usage conditions in summer and winter grazing areas have always been subject to agreements between livestock herders and landowners, and this situation will not be modified by the Project.

Remark N° 82

Tourism

In Chapter 6, page 6, it is stated that:

"In general, the area shows growth in tourism development, leveraging its scenic qualities and natural attractions; this is in contrast to the presence of little tourism equipment and infrastructure, or associated services."

The Environmental Impact Study should take into account that this scarcity of tourism equipment and infrastructure is exactly the reason why many visitors choose to come to the area: this is its key strength, and the reason why many Chilean and foreign tourists select this area, because it is not marred by any type of infrastructure.

A few examples: <http://www.difrol.cl/CUMBRES%20VISITADAS%20A%C3%91O%202005.htm>

(See information on the Marmolejo and Tupungato peaks)

<http://www.escalando.cl/arenas.htm>

http://www.andesmountain.cl/santiagotrekking/fulldav_esp.html

<http://www2.inq.puc.cl/~cseebach/mountain/index.en.html>

<http://www.chile-travel.com/chile-climbing.html>

<http://www.amazon.com/Lonelv-Planet-Trekking-Central-Andes/dp/1740594312>

http://www.andesmountain.cl/chilemontana/marmolejo_sanjose_inq.html

<http://www2.inq.puc.cl/~cseebach/mountain/central/tupungato/index.html>

<http://www2.inq.puc.cl/~cseebach/mountain/central/maipo/index.html>

[http://links.jstor.org/sici?sici=0016-7398\(194605%2F06\)107%3A5%2F6%3C225%3ATCEITC%3E2.0.CO%3B2-Q](http://links.jstor.org/sici?sici=0016-7398(194605%2F06)107%3A5%2F6%3C225%3ATCEITC%3E2.0.CO%3B2-Q)

<http://www.turistel.cl/v2/secciones/actividades/escalada/escalada.htm>

<http://macomontaquax.wordpress.com/2007/02/19/expedicion-al-cerro-Marmoleio-6108-msnm/>

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

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The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing

- emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **TUR Tourism**

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 83

Tourism

In Chapter 5, point 5.6.2.4, part B: It is indicated that:

"With regard to basic infrastructure, there is a paved road to El Alfalfal, which is in a good condition; the high mountain areas of the region are accessible only along a private road owned by GENER S.A. Tourism signage and road signage is not adequate, with signs in a poor state of repair and some areas lacking signage altogether; public transport into the region is lacking".

It should be made clear that the lack of tourism activity and infrastructure described above can be attributed to the difficulties placed on access to the area's mountainous regions; this access depends precisely on the owner of the road leading to the high mountains, AES Gener.

This situation should be mentioned in the study as background information, relating to the attitude that the Company may adopt in other areas.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

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The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social

Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayes, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions. The Project's has been designed and engineered to include a suite of measures for the optimization

of the construction of new roads; for further information on these measures, see

Chapter 2, point 2.3.2.5 of the EIS.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

Remark N° 84 Tourism - Activities

In Chapter 5, section 5.6.2.4 part D. El Volcán - Baños Morales area, Page 68, the following points are specified regarding tourist activities in the area:

(1) Hiking and trekking, (2) Medium and high mountain climbing, (3) Rock climbing, (4) Horse riding, (5) Picnicking, (6) Rock hunting and archeological research, (7) Wildlife watching and appreciation of plant life (8) Use of thermal springs, and (9) Cycling.

Using this numbering system, it should also be indicated that all of these activities are also conducted in the following areas:

Valle de las Arenas: activities (1), (2), (3), (4), (6) and (7) and (9). This area receives visitors in both winter and summer seasons, and is a very important site for tourism in the area - at least as much so as the Valle de Lo Valdés, which is mentioned.

Valle del Mesoncito: activities (1), (2) and (3).

Valle del Morado (as far as Laguna del Morado and beyond): activities (1), (2), (3) and (4). A major site for these activities.

Valle de la Engorda and Valle del Marmolejo: principally activities (1),

(2) and (3). Valle de Colina.(1), (2), (3) and (8)

All of these areas attract Chilean and foreign visitors, even during the winter season, and it should also be made clear that the Valle del Marmolejo is a particularly significant site in world tourism, being the planet's most southerly mountain of over six thousand meters - a feature that leads to global renown.

AES Gener's EIS should be more rigorous in mentioning activities conducted in areas located close to planned site installations. For its part, the company should offer a binding agreement to preserve and respect current access conditions - free, open access with no need to request authorizations or to present documents, without barriers or guards requesting that visitors show their identification.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects

associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **TUR Tourism Scenery**

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.05 Free transit

Remarks and Responses

Remark N° 84 Page 3

The PHAM shall not interrupt access by mountain climbers, hikers, or permanent or sporadic visitors who enter the area for leisure, sports, cultural activities, etc. For safety reasons, the PHAM will restrict access only to its installations and work sites. Similarly, there will be no restrictions on access to properties owned by third parties and used for livestock grazing; in other words, usage conditions in summer and winter grazing areas have always been subject to agreements between livestock herders and landowners, and this situation will not be modified by the Project.

Remark N° 85

Legal - Tourism

In Chapter 6, page 3, it is stated that:

"6.3.2 Identification of Components Vulnerable to Impact

It should be pointed out that the area where the PHAM is to be installed features the following unique features, which have been granted particular emphasis in the evaluation conducted:

- Presence of officially protected areas.
- Presence of tourist activities at nearby sites.
- Presence of natural environments of conservation interest.
- Presence of areas of archeological interest at nearby sites."

The Environmental Impact Study should be expanded to include:

Presence of tourism and scientific activities in the areas planned for works installations and project usage.

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

ARQ.03 Scientific research

The scientific and cultural importance of the paleontological resources present has been recognized by the PHAM Project Owner, leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the Project Owner has taken on a commitment to enhance knowledge of the area before starting planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may be detected during the course of construction under the PHAM. These activities will contribute not only to the maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of materials or components present.

For more information, see **Annex 14 of Addendum 1**.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plant (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

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The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict

management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased. The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

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These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
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Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **PRO.02 EIS Additional and Complementary Information**

In accordance with consultation procedures conducted by oversight services, further studies and information have been incorporated into Addendum 1, which complements existing information provided in the EIS. Regarding ecological flow rates (**Annex 17**), cultural heritage (**Annex 14**) and the management of summer grazing areas (**Annex 6**).

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

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Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

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Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 86

Access Restrictions - Tourism

The final two paragraphs of point 5.6.3, in Chapter 5, titled Conclusions, state that:

"..., first of all, the Colorado River Basin area features development of observation and hiking tourism, conducted in the middle and lower Colorado River Valley, limited by the lack of any tourism infrastructure in the area; access to the upper stretches of the watercourse is controlled by private interests, meaning that a typical tourist is unable to access sites located along the Upper Colorado River."

It should be made clear that these controlling "private interests" are the company AES Gener itself - this is useful background information, relating to the attitude that the Company may adopt in other areas.

"... In the third area, on the Yeso River, there is a noteworthy absolute lack of tourism infrastructure, resulting in a significant proportion of the area's tourism being informal and spontaneous; similarly, the area has no settlement that would serve as a "center" for the development of tourist activities, and yet the area is also

strongly limited by climate conditions, which at times lead to the closure of Route G-455."

It should be made clear in the EIS that one of the reasons for the nearly complete absence of tourism in the area is the fact that it is controlled by private interests - in this case, Aguas Andinas. This may set precedents regarding the control exercised by companies in the areas where they hold land, and the possible resulting danger to tourism in the area. This also causes a danger to health, as people find themselves with ever more limited opportunities to engage in physical or leisure activities in an untouched environment.

In the areas involved in the Project, assuming that it goes ahead, AES Gener should offer a binding agreement to preserve and respect current access conditions - free, open access with no need to request authorizations or to present documents, without barriers or guards requesting that visitors show their identification.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and

- access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **TUR Tourism**

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The

layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayas, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions. The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS**.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

VIA.05 Free transit

The PHAM shall not interrupt access by mountain climbers, hikers, or permanent or sporadic visitors who enter the area for leisure, sports, cultural activities, etc. For safety reasons, the PHAM will restrict access only to its installations and work sites. Similarly, there will be no restrictions on access to properties owned by third parties and used for livestock grazing; in other words, usage conditions in summer and winter grazing areas have always been subject to agreements between livestock herders and landowners, and this situation will not be modified by the Project.

Remark N° 87

Scenic Value - Tourism

In Chapter 5, page 7, table 5.9.3.2, Visual quality and fragility, High River Landscape Unit Volcán, it is stated that:

With regard to Traditional Value, it should be indicated that, as well as the points mentioned, this is an area that is widely visited by Chileans and foreigners, courses in mountaineering, rock climbing, ice climbing, mixed climbing, and camping techniques; that is, the seasonal grazing activities mentioned in the EIS are not the only uses to which the area is put, as shown in the following web links (the product of a simple Google search) that demonstrate the truth behind this assertion:

http://www.andesmountain.cl/santiagotrekking/trekking_morado.html
<http://www.caucen.com/foros/viewtopic.php?pid=468>
http://www.escalando.cl/morado_kalkwand.htm (where some project works are to be sited)
<http://www.montaña.uchile.cl/foros/viewtopic.php?t=852>
<http://www.loscorrecaminos.cl/cabalqatas.htm>
http://www.elbruio.cl/estero_morado.htm
<http://www.elbruio.cl/union.htm>
<http://www.refuqiolovaldes.com/actividades.html#office>
<http://www.refuqiolovaldes.com/actividades.html#fandinism>
<http://www.refuqiolovaldes.com/actividades.html#trekking>

Would such a range of tourism services be available if there were merely a grazing area?

Furthermore, with regard to physical accessibility, the Environmental Impact Study should establish that the area in question is one of the few sectors of the high Andes that can still be freely accessed by anyone who wishes to visit it; additionally, as a result of its physical isolation it retains a high level of conservation, without any past need to restrict access to it with any kind of barrier or to require any paperwork for entry permits.

Thematic responses

TUR Tourism

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayes, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions.

The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS**.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

Remarks and Responses

Remark N° 87 Page 2

The PHAM shall not interrupt access by mountain climbers, hikers, or permanent or sporadic visitors who enter the area for leisure, sports, cultural activities, etc. For safety reasons, the PHAM will restrict access only to its installations and work sites. Similarly, there will be no restrictions on access to properties owned by third parties and used for livestock grazing; in other words, usage conditions in summer and winter grazing areas have always been subject to agreements between livestock herders and landowners, and this situation will not be modified by the Project.

Remark N° 88

Social Impact - Mitigation

AES Gener's proposal for the promotion of tourism in the area consists of a leaflet and a website, which would be added to the many such materials already in existence for the area. This proposal shows the company's indifference and lack of concern for a fragile community that is by no means wealthy, while complying with the letter of the law defining "social benefit".

Considering the Project's real impact and the investment that it will imply (600 million dollars), this planned investment in publicity is clearly insufficient to provide grounding for the Project presented in terms of social benefit.

AES Gener should offer real, long term, sustainable improvements for the different communities in the area, such as:

- * Construction of sports areas, and their maintenance in the long term (throughout the operating life of the Project).
 - * Usage of muck disposal heap sites to create new recreation areas.
 - * Construction of installations to contribute to local tourism in the area.
 - * Wide-ranging training to support personal business ventures.
- * Supply of information to communities in advance of the fact and in a timely manner regarding potential changes in ways of life.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **TUR Tourism**

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 89

Scenic Value and other issues

In Chapter 4, point 4.3.5, pages 21 and 22. In view of the statements made on these pages, and that on page 22

"IT IS CONCLUDED THAT THE PROJECT SHALL NOT GENERATE SIGNIFICANT ALTERATION TO THE LANDSCAPE VALUE OF THE AREA WHERE IT IS TO BE INSTALLED".

AES Gener should accept a binding commitment that the Project will permit the implementation of scientific, cultural, and educational activities, as well as leisure, sports, tourism, free passage, farming, livestock herding, and other actions, both by Chileans and by foreigners, as have traditionally been conducted before the Project's entry into the SEIA. The company should adopt an absolute commitment regarding protection of the area's cultural and scenic richness, and quality of life.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plant (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

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The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative,

that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

CAL.02 Education

A goal of the Maitenes Foundation relates to education for children and young people against the backdrop of the natural environment (for more information on the goals and achievements of the Foundation, see Annex 26 of the EIS).

Gener firmly believes that contributions to the technical and vocational education and training of young people must keep sight of real employment possibilities. Therefore, as a first initiative it has earmarked resources for an education improvement project in the district, which will contribute to establishing education management for the restructuring of the school curriculum and professional technical capacity building, taking into account the features needed to boost local employability. Based on information and recommendations from this study, Gener, acting through the Maitenes Foundation, will undertake a Capacity Building for Employability Program fundamentally oriented towards those whose family, social, or economic situation has barred them from completing their education and training, or acquiring the skills needed in order to find work.

CAL.03 Sports and leisure areas

In order to avoid the loss or modification of land usage patterns, changes in usage, or loss of income associated with potential reduction in perceptions of the value of the surrounding areas, in terms of the provision of leisure, tourism, education, and other related services, the Project has developed a suite of measures that aim to minimize its environmental impact, so as to preserve the features that lead to the high perception of value of the area among residents, visitors, and tourists. These measures include: installation of most works in underground settings, thus minimizing their visual impact; the preservation of ecological flow rates in rivers and streams; and revegetation and reforestation of affected areas.

Similarly, the Project has enacted a suite of further measures to minimize interference with traditional livestock industries, as well as tourism and mountain/river sports.

In this way, the Project has taken all steps necessary in order to mitigate impacts on the environment, which will allow the area to retain the characteristics that make it so attractive for open-air education, tourism, and leisure activities. This will allow the project to operate alongside existing activities conducted in this area.

A wide-ranging suite of monitoring activities will be implemented to verify the effectiveness of the environmental measures (for more information, see **Chapter 8 of the EIS**). In parallel, and in order to verify that the Project does not affect cultural land usage patterns, applicable indices will be included for monitoring under the Social Indicator Monitoring (SIM) program.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**.

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.03 Visual impact

The Project is to be located, taking into account esthetic and perceptual considerations and emphasizing the characterization and appraisal of the issues of visibility, quality, and visual fragility of the landscape.

In terms of Landscape Alteration or Landscape Impact associated with this infrastructure project, potential effects are classified as either limited duration - generally applying during the construction phase - or permanent, for effects that shall persist during the operations phase and continue throughout the working life of the Project. A qualitative and qualitative methodology is used to study these effects, whereby the first phase consists of identifying sources of visual impact, and the second phase relates to identifying and classifying environmental impacts. As a general rule, it is assumed that impact on the landscape during the construction phase shall be temporary, mainly due to the transitory nature of the sources of impact, the low level of prior human activity in certain areas, and the relatively low level of physical and visual accessibility of a significant proportion of the area subject to intervention. As most of the Project construction works will be situated underground, during the operations phase the main visual signatures of its existence will be the intakes and access roads. For further information on the methodology used for landscape impact assessment, see **Chapter 6, Section 6.1.4.10 of the EIS, and Annex 17 of Addendum 1.**

Remark N° 90 EIS Basis

It is vital that the EIS must be based on real plans for the Project, not on a basis, regulations, and layouts that could be developed and change in many different ways. In the final, defined physical project, this background information would certainly related to a materially different EIS. The environmental impact study of AES Gener should clearly express the details of the project itself, not general considerations.

Thematic responses

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.02 EIS Additional and Complementary Information

In accordance with consultation procedures conducted by oversight services, further studies and information have been incorporated into Addendum 1, which complements existing information provided in the EIS. Regarding ecological flow rates (**Annex 17**), cultural heritage (**Annex 14**) and the management of summer grazing areas (**Annex 6**).

Remark N° 91 Construction Waste

In Chapter 4, point 4.3.1, page 4, construction waste.

It is indicated that these materials will be stored on a temporary basis in specially prepared sites, awaiting reuse or sale. However, the plan does not establish the length of the maximum waiting period or what will happen if this time period is exceeded, if items fail to be reused or sold. They could remain in the Andean valleys forever, affecting the health of persons and the environment, with knock on effects on tourism in areas where this occurs.

The Project Owner should agree to remove these materials within a time period no longer than six months from the end of the construction phase.

It should be made explicitly clear that AES Gener shall be directly responsible for the suitable removal of waste generated at the Project's encampments and site installations, even when these activities are conducted by contractors.

The Project Owner should specify what will be the fate of the encampments and site installations once the construction of the Project's tunnels and conduits has been completed.

AES Gener should agree to leave the surroundings as it found them before starting the EIS.

Thematic responses

RES Waste

The Project Owner indicates that most waste generated will be produced during the Project's construction phase. Two types of waste will be produced:

- **Solid waste:**
Construction waste such as wood, piping offcuts, rubble, wires, waste packaging, metals, etc.
Domestic waste or waste similar to domestic waste; plant waste such as remains of shrubs, weeds, and smaller quantities of tree waste removed from work sites.
- **Liquid waste:**
Applicable to the following activities: concrete production, washing and preparation of aggregates, and washing of truck chassis and load beds, machinery, and tools. Other liquid waste relates to wastewater from bathrooms, showers, canteens, and other activities conducted within encampments and site installations.

Gener will place strict contractual requirements on Contractors during the construction phase, aiming to ensure suitable management and final disposal of waste. Additionally, contractors and subcontractors shall agree to comply with regulations and oversight actions established by Law, to be applied to all works of this nature. The planned environmental management manual will prevent the occurrence of any pollution events linked to the Project (**see EIS, Annex 18**).

RES.01 Regulations and Responsibilities

In order to ensure the efficient, safe, and responsible treatment and management of waste matter generated by the PHAM an additional plan has been developed, the "Waste Management Plan for Work Sites, Works Installations, and Encampments", describing the procedures and equipment necessary for the management and disposal of waste produced during the construction of the Project, and which also specifies the responsibilities required under its implementation, what records must be kept, and what reports must be prepared for the purposes of control and oversight (Annex 18 of the EIS).

Gener will enforce implementation and compliance with the Project's environmental measures during construction management, placing strict contractual requirements on Contractors with the aim of ensuring suitable management and final disposal of waste. **RES.02 Location**

a) Handling of solid waste

Infrastructure for the integrated management of solid waste throughout the life of the Project, addressing the full gamut of temporary storage, preparation, and classification for transport, will comprise: waste collection and storage sites at the point where it is generated; areas for non-hazardous waste; and an area for hazardous waste. These waste storage areas, for non-hazardous and hazardous waste, will be located as shown in tables 5.1.1 (pages 7 and 8) and 5.3.1 (pages 11 and 12) in Annex 18 of the EIS, respectively.

Domestic waste and organic waste similar to domestic waste will be disposed of in a sanitary landfill site, while construction waste other than rubble and domestic waste or organic waste similar to domestic waste will be sent to the waste management area for classification, where materials with potential residual value will be returned for reuse or recycling, and the remainder will be dispatched to a sanitary landfill site (Annex 18 of the EIS, page 6).

b) Handling of liquid waste

● Wastewater

Wastewater produced in encampments will be subject to primary and secondary treatment, provided by installing modular activated sludge treatment plants at each encampment. These systems are based on unitary operations, with units designed and equipped to treat wastewater input such as to attain a level of purity sufficient for discharge or reuse with no associated risks to persons or to the environment, in full compliance with the regulations stipulated in Supreme Decree 1-90.

Wastewater generated at work areas, through the use of chemical bathrooms, will be transported to by the contractor in wastewater transport trucks to authorized sites for subsequent treatment.

Sludge generated through wastewater treatment will be removed by the works contractor for transport and disposal at authorized sites on a weekly basis. The sludge will be removed in wastewater transport trucks, and in accordance with the volume of sludge

produced it is expected that each encampment will require 2 to 3 journeys by 6 m³ capacity wastewater transport trucks per week, throughout the construction phase. Meanwhile, during the operations phase, the project will use the existing installations at the existing Alfalfa Plant Control Room, with no requirement to install a new wastewater treatment system, and thus not producing the sludge that such a system would generate.

For more information, see **Annex 18 of the EIS**.

- **Liquid industrial waste**

In view of the characteristics of this type of wastewater, the project plans to install a sequential sedimentation system. In view of this situation, a settling pond will be installed at each work site to permit the separation of liquid industrial waste into clear water and settleable sludge.

(see **Annex 5 of Addendum 1**)

RES.03 Characteristics

The types of waste to be produced during the construction phase, and the characteristics thereof, are as follows:

Characteristics of solid waste

Solid non-hazardous waste

This class of waste includes:

- Construction waste: consisting of wood, piping offcuts, rubble, wires, waste packaging, metals, empty cans and drums used to transport paint and adhesives, and other similar items.
- Domestic waste and other waste similar to domestic waste: basically includes leftover food from canteens, packaging, paper, card, and similar materials.
- Plant waste: consisting of remains of shrubs, weeds, and smaller quantities of tree waste removed from work sites.

Hazardous solid waste

Types of hazardous waste produced by the Project correspond to waste generated in workshops, storage areas, and work sites, such as:

- Solvents
- Oil waste
- Lubricating grease
- Batteries
- Oil filters

Characteristics of liquid waste

Wastewater

This class of liquid waste relates to wastewater from bathrooms, showers, canteens, and other activities conducted within encampments, site installations, and work sites. This wastewater will be subject to primary and secondary treatment, provided by installing modular activated sludge wastewater treatment plants at each encampment.

Liquid industrial waste

Liquid industrial waste shall be generated only through the following activities: concrete production, washing and preparation of aggregates, and washing of truck chassis and load beds, machinery, and tools.

As a result of this fact, this type of liquid waste shall be generated only at work sites.

Meanwhile, wastewater shall not be produced at the Project's encampments, as these areas shall be used only for personnel lodgings.

For more information, see **Annex 18 of the EIS**.

RES.04 Impact

Gener considers the suitable handling of waste produced by the Project to be of particular importance, and to this end it has designed rigorous programs for the handling, collection and storage, transport, and final disposal, reuse or sale of the different forms of waste that shall be generated at the Project's encampments and site installations, as well as its work sites. These programs have been designed specifically taking into account the particular features of the area where the Project is to be implemented, as well as regulations in force and the requirements imposed by the authorities during the Project's environmental evaluation. In general this category includes non-hazardous waste produced during construction activities and from domestic sources (the latter at workers' encampments), and production of this waste will cease at the end of the construction phase:

- Liquid waste will be reused or disposed of in compliance with applicable sector regulations. All discharge of treated wastewater will be conducted at isolated points, generally without the presence of other human use and with low physical and visual accessibility.
- For both hazardous and non-hazardous waste, the Project Owner plans to transport material for disposal in authorized sites, eliminating the possibility of creating centers of soil or water contamination that might have a negative effect on the quality of the area's scenery. The storage areas, rubble, and other materials stored on a temporary basis within site installations shall be removed once construction activities have been completed, and therefore shall have no impact on the landscape.

SLD Health Impact

The Project owner shall take responsibility for ensuring compliance with health and safety regulations, in order to prevent any possible risk to health and physical integrity for the inhabitants of San José Maipo as well as the persons working on the Project.

SLD.02.01 Pollutants

The Project's atmospheric emissions will correspond to dust suspended in the air as a result of earth moving activities (during excavations, loading and unloading, etc.), and the movement of vehicles at surface work areas. Emissions control will be conducted by means of:

- conservation of existing roads currently used by mine trucks,
- all new roads built will be treated with bischofite. Additional information provided in Section I, Question 42 and Section VI, Question 17, in the Addendum.
- use of tarpaulins covering truck loads,
- timely mechanical maintenance of equipment, machinery, and vehicles, and wetting of dusty surfaces
- use of wagons and belt conveyors for the removal of muck from within tunnels, and similar.

The Project Owner has conducted three studies to estimate emissions, which are included

in Annexes 4 and 5 of the EIS. These studies describe the analysis of estimates of atmospheric emissions caused by the PHAM, as well as the Emissions Compensation Program. The study identifies the Project activities that generate emission, quantifies the amount of emissions thus produced, estimates the quantity of emissions for each pollutant during each year of the construction phase, and, finally, develops the Project's emissions compensation program.

Remark N° 92 EIS for connection to the SIC Central Grid

The AES Gener environmental impact study does not specify how the electricity generated will be supplied to the SIC Central Electricity Grid. AES Gener should include full information regarding this sub-project in the EIS, as it is one of the units that make up the PHAM, given the fundamental linkage between the two projects. The same applies with regard to the concession to build and operate the hydroelectric plants, which should also be considered an integral part of this project, and which concession is currently not held by AES Gener.

This remark is presented with the concrete aim of preventing the authorization of one of these projects from implying a superficial examination of the others, in the sense that, if one of these projects is approved, the next will become a matter of "business necessity" for the Project Owner. Conversely, if the EIS addresses the activities of tunneling, water abstraction, power generation, and electricity distribution as a single unit, this will permit an enhanced perspective to be gained regarding the impact of the Project as a whole, such that all of its effects may be correctly evaluated.

Thematic responses

ELE Electrical Installations

The electrical installations presented in the EIS comprise the substation, to be located in the El Sauce area, the characteristics of which are to be found in **Annex 27 of the EIS**; given that the electricity transport layout (cabling and towers) is to be presented to the Environmental Impact Assessment System once all background information is available.

ELE.03 Transmission lines

In view of the project's location, close to Santiago, it is expected that the distance covered by the definitive cabling layout will be short, involving a minimum of sectors not subject to prior intervention. With regard to the specific location of the cabling layout, plans call for the use of the existing high tension power line used by the Queltehue, Volcán, and Maitenes Plants.

Once the layout of the high tension power line has been defined, the Project Owner will submit this plan to the Environmental Impact Assessment System, in accordance with legislation in force. In line with the development of the Compliance Plan for environmental legislation applicable to the Project, the General Regulations applicable in this instance are indicated below:

Decree with Force of Law N°4, dated 05 February, 2007, setting forth the Recast, Coordinated, and Systematized Text of the General Law on Electrical Services.

The General Law on Electrical Services governs the generation, transmission, distribution, and regimen of concessions and tariffs applicable to electrical energy, and the functions of the State with regard to these areas.

Supreme Decree N° 327, Regulations Regarding the General Law on Electrical Services

The Regulations Regarding the General Law on Electrical Services establish, in their 8th Article, that hydroelectric power plants, electrical substations, and transmission lines may be installed without making a request for a concession, when the interested party wishes. These concessions may be provisional (in order to study projects) or definitive. A definitive concession is granted by a supreme decree issued by the Ministry of the Economy, by order of the President of the Republic. Permits relating to electrical installations that do not require concessions are granted by the corresponding Municipal Governments.

For further information and analysis on the aforementioned regulations, with regard to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see **Sections 3.1.6 and 3.1.7 of Chapter 3 of the EIS**, where more detailed versions of this information can be found.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water

from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

PRO.03.01 Intakes

The Alto Maipo Hydroelectric Project (PHAM) plans to capture water resources at eight different points. The Project holds in-stream water rights at each of these points, and the concessions granting rights at most of these points include ecological flow rate stipulations issued by the Directorate General of Water (DGA).

The water intake points are as follows:

For the Alfalfal II Plant: the El Morado Stream, the La Engorda Stream, the Colina Stream, the Las Placas Creek, and the Yeso River. For the Las Lajas Plant: the Alfalfal Plant discharge, and the Colorado River at the Maitenes Intake. For a detailed description of planned installations, see Chapter 2, Section 2.2.2 of the EIS, and attached Annexes 1 and 8.

See Annex 12 of the EIS for a map of intakes in the PHAM area of influence. See Table 2.2.2, in Chapter 2 of the EIS, for the characteristics and descriptions of the intake installation.

For information on the Project's impact on water quality in the area's watercourses arising as a result of the construction of intakes, see Section I, Question 3 in the Addendum.

For the intake maintenance plan, the Chapter 2, Section 2.2.2 of the EIS, and additional information provided in Section I, Question 11 of the Addendum.

For clarifications regarding the El Yeso Reservoir, see Section I, question 27 in the Addendum.

For details on the construction methods and the mitigation and compensation measures planned by the Project to address the environmental impact of the intakes, see Annex 6 of the Addendum.

PRO.03.02 Tunnels

The majority of the Project is planned for installation underground. The general characteristics of the tunnels are described in Chapter 2 of the EIS, Table 2.2.5 (for detailed geological information on the path taken by the tunnels, see Annex 46 of the EIS).

For an evaluation of the impact and environmental management measures associated with underground installations, see Chapter 6 of the EIS.

Annex 45 of the EIS, Hydro-Geology of Underground Works, presents a general description of the geological conditions that are expected to be found along the lengths of the tunnels; expected permeability based on geological knowledge and hydro-geological conditions in the area, incorporating experience gained during the construction of tunnels for the Alfalfal Plant, which has been operative for more than 17 years; as well as a description that includes the design of the tunnels, providing a brief explanation of the methods to be used to reduce and control water seepage.

With regard to the impact of the path taken by the tunnel passing underneath the El Morado Natural Monument, and measures to be taken to respect the area, see Section I, Responses 4, 5, and 6, in the Addendum.

Remark N° 93

Flow rates - "Hanging" channels

A danger exists that a vast number of existing irrigation channels might be left "hanging" - that is, their intakes could be left at a higher level than the rivers that feed them, in view of reduced flow rates in these rivers. It is estimated that this problem could affect the irrigation of more than 500 hectares of agricultural land. AES Gener should conduct studies on a case by case basis to assess this situation, and these studies should be subject to approval by the Directorate General of Water (DGA). This will require the preparation and presentation of a map to be included in the EIS, showing all water intake works located within the Project's area of influence, as well as all natural watercourses subject to intervention.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds in-stream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in **Chapter 2 of the EIS**.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that is, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**).

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 94 Noise Emissions

The Environmental Impact Study should take into account the fact that sources of noise located far from settlements may still affect tourism, and that many persons may cease to visit the areas where construction is to be conducted due to the noise and visual effects caused by a construction site of this nature. Harmful effects on local fauna will also occur.

The Environmental Impact Study should also address noise that may be generated by the construction Project's water conduits. Failure to take this point into account will result in many people losing part of their income derived from vehicle rental, transport, entry fees, sale of food, mule rental, horse rental, tourist guide services, etc.

AES Gener should clearly establish in the EIS what actions it will take to mitigate noise emission in areas located far from settlement, but of interest to tourism or frequented by wildlife.

Thematic responses

RSG Risk

The Project Owner possesses a general risk prevention strategy that imposes certain measures on the Project during its different stages of advance. This strategy features the following components:

- a) Measures incorporated into the Project's engineering design.
- b) Systematic verification of compliance with applicable regulations
- c) Establishment of restricted areas
 - c.1) Area restricted due to their archeological, paleontological, or heritage value
 - c.2) Area of natural value that requires protection by the Project
 - c.3) Officially protected area.
- d) Expert supervision during construction
- e) Training regarding environmentally sensitive issues
- f) Internal risk management and accident prevention programs
- g) Separation of works installations and encampments

For further information on each of these points, please see **Chapter 7 of the EIS**, which specifies the **Environmental Management Plan**, the **Risk Control and Prevention Plan** designed for the Project, the safety measures to be adopted in light of the risks identified, and, finally, the **Accident control plan**, to be activated in the event of the failure of the preventive measures taken by the Project Owner. Furthermore, **Annex 32 of the EIS** presents the **Risk and Contingency Prevention Plan** for contractors.

RSG.03 Blasting

Excavation methods using explosives will be used for the excavation of a proportion of the tunnels involved in the Project. Other tunnels will be excavated using a Tunnel Boring Machine, as described in **Section 2.3.2.2 the EIS**. The surface points where blasting will lead to perceptible effects are

located close to the entrances of the tunnels that are to be constructed using the traditional drill and blast excavation technique (**Section 6.4.1.2 and Section 6.4.1.3 of the EIS, and Section 6, Question 26 in the Addendum**). At surface locations in areas where tunnels are to be excavated using the traditional method, no vibrations will be caused that could lead to risks of landslides, rock falls, and landslips resulting from the construction of the tunnels, because these excavation techniques will be used at a great depth below the surface.

Noise from blasting will only be audible during the opening of the ends of the tunnels. Once inside the tunnels, excavation works (including detonations) will not be audible, and therefore will not constitute a significant source of noise, and audible blasting will therefore only occur while the ends of the tunnels are being excavated. It is estimated that there will be 2 or 3 detonations per day at each work site. Based on these

levels, added to the background noise in each area, it was determined that noise will not rise above the maximum level permitted under MINSEGPRES Supreme Decree 146/97. For more information on this topic, see **Section 6.4.1.2 of the EIS** and **Section 8.2.2 of the EIS**, which describe the noise and vibration monitoring program associated with the blasting activities, as established in **Section 6, Question 41 of the Addendum**.

It is important to point out that a controlled intervention will be completed in advance of blasting, consisting of the installation of work platforms, through the removal of vegetation and the rescue of individual plants and/or animals of conservation interest that present low mobility, limited populations, and endemism, and other characteristics of the project and the range of the species in question (see Annex 4 of the Addendum), in particular through the implementation of the "Wildlife Rescue and Relocation Plan".

Regarding the construction of the El Volcán Tunnel, located beneath the El Morado Monument, the depth of the tunnel will vary between 550 m and over 1500 m. No impacts are expected relating to vibrations reaching the El Morado Glacier. For more information, see **Addendum 1, Section 6, Response 13 and Section 1, responses 4, 5 and 6**.

With regard to safety measures planned applying to the handling and storage of explosives, specified in Annex 32 of the EIS, regulatory stipulations for risk prevention and emergency control are provided that will apply to all contracting of works and/or services by Gener, in compliance with the requirements set forth in Law 16,744, Article 66 part 2. See also **Addendum 1, Section 1, Question 35**.

SLD Health Impact

The Project owner shall take responsibility for ensuring compliance with health and safety regulations, in order to prevent any possible risk to health and physical integrity for the inhabitants of San José Maipo as well as the persons working on the Project.

SLD.03 Acoustic

In the field of Environmental Impact, specifically acoustic impact, the Project Owner has conducted a wide-ranging study to estimate acoustic emissions generated during the construction of the PHAM. For more information on the acoustic impact of the PHAM, and methodologies, modeling techniques, and actions to be taken to minimize such impact, please see **Annex 30 of the EIS** and **Section II, Question 8 in the Addendum**.

Plans for blasting activities, specifically including the frequency, quantity, timing, and work periods of blasting, will be determined on site in accordance with the characteristics of each works activity and work site. Works installation working days will be designated to prioritize the completion of surface works during the

daytime (8:00-21:00 hrs.); for blasting activities, plans call for an information program at the time of the activity, defining and clarifying the periods when noise-producing activities will take place, in order to integrate the community into efforts towards the completion of the Project. Another point worthy of emphasis is that the work sites (tunnel excavation, access windows, and entrances/exits) will not be sited close to settlements, thus preventing most of the potential acoustic impact that could be caused by the PHAM.

Wildlife rescue will be conducted through animal rescue activities based on the trapping of reptiles and amphibians before explosives are used, before service tracks are built, and before the modification of river flow.

Finally, and in order to comply with the requirements set forth above, the Project Owner shall be subject to:

1. Supreme Decree 146 (Establishing Standards on the Emission of Nuisance Noise Generated by Fixed Sources) establishing maximum permissible sound pressure levels, corrected according to technical criteria to evaluate and classify nuisance noises generated by fixed sources affecting the community, such as industrial, commercial, leisure, and artistic activities.
2. Exempt Decree 130 (Establishing restrictions on the movement of cargo trucks). The movement of trucks larger than 4 tons will be suspended from 14:00 hours on Saturdays through to midnight on each Sunday night on Route G-25 and Route G-421.

For more information on the acoustic impact of the PHAM, and regulations (Chapter 6 of the EIS), mitigation measures, methodologies, modeling techniques, and actions to be taken to minimize such impact, please see Annex 30 of the EIS, as mentioned above.

Finally, in order to verify the effectiveness of the mitigation measures taken, noise monitoring will be conducted at 8 sensitive points, following the procedure established in MINSEGPRES Supreme Decree 146/97, in order to verify compliance with the maximum permitted limits for sound pressure level (see details in **Chapter 8 of the EIS, Section 8.2.2**).

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. In parallel, the study investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 95 Noise

With reference to the information presented in Chapter 2, Page 56, an explanation should be provided as to what media will be used to indicate the times and dates of particularly noisy works activities.

If the implementation of the Project is authorized, AES Gener should refrain from generating noise of any kind during weekends and holidays, in both populated areas and zones of interest for tourism.

Thematic responses

RSG Risk

The Project Owner possesses a general risk prevention strategy that imposes certain measures on the Project during its different stages of advance. This strategy features the following components:

- a) Measures incorporated into the Project's engineering design.
- b) Systematic verification of compliance with applicable regulations
- c) Establishment of restricted areas
 - c.1) Area restricted due to their archeological, paleontological, or heritage value
 - c.2) Area of natural value that requires protection by the Project
 - c.3) Officially protected area.
- d) Expert supervision during construction
- e) Training regarding environmentally sensitive issues
- f) Internal risk management and accident prevention programs
- g) Separation of works installations and encampments

For further information on each of these points, please see **Chapter 7 of the EIS**, which specifies the **Environmental Management Plan**, the **Risk Control and Prevention Plan** designed for the Project, the safety measures to be adopted in light of the risks identified, and, finally, the **Accident control plan**, to be activated in the event of the failure of the preventive measures taken by the Project Owner. Furthermore, **Annex 32 of the EIS** presents the **Risk and Contingency Prevention Plan** for contractors.

RSG.03 Blasting

Excavation methods using explosives will be used for the excavation of a proportion of the tunnels involved in the Project. Other tunnels will be excavated using a Tunnel Boring Machine, as described in **Section 2.3.2.2 of the EIS**. The surface points where blasting will lead to perceptible effects are

located close to the entrances of the tunnels that are to be constructed using the traditional drill and blast excavation technique (**Section 6.4.1.2 and Section 6.4.1.3 of the EIS, and Section 6, Question 26 in the Addendum**). At surface locations in areas where tunnels are to be excavated using the traditional method, no vibrations will be caused that could lead to risks of landslides, rock falls, and landslips resulting from the construction of the tunnels, because these excavation techniques will be used at a great depth below the surface.

Noise from blasting will only be audible during the opening of the ends of the tunnels. Once inside the tunnels, excavation works (including detonations) will not be audible, and therefore will not constitute a significant source of noise, and audible blasting will therefore only occur while the ends of the tunnels are being excavated. It is estimated that there will be 2 or 3 detonations per day at each work site. Based on these

levels, added to the background noise in each area, it was determined that noise will not rise above the maximum levels permitted under MINSEGPRES Supreme Decree 146/97. For more information on this topic, see **Section 6.4.1.2 of the EIS** and **Section 8.2.2 of the EIS**, which describe the noise and vibration monitoring program associated with the blasting activities, as established in **Section 6, Question 41 of the Addendum**.

It is important to point out that a controlled intervention will be completed in advance of blasting, consisting of the installation of work platforms, through the removal of vegetation and the rescue of individual plants and/or animals of conservation interest that present low mobility, limited populations, and endemism, and other characteristics of the project and the range of the species in question (see Annex 4 of the Addendum), in particular through the implementation of the "Wildlife Rescue and Relocation Plan".

Regarding the construction of the El Volcán Tunnel, located beneath the El Morado Monument, the depth of the tunnel will vary between 550 m and over 1500 m. No impacts are expected relating to vibrations reaching the El Morado Glacier. For more information, see **Addendum 1, Section 6, Response 13 and Section 1, responses 4, 5 and 6**.

With regard to safety measures planned applying to the handling and storage of explosives, specified in Annex 32 of the EIS, regulatory stipulations for risk prevention and emergency control are provided that will apply to all contracting of works and/or services by Gener, in compliance with the requirements set forth in Law 16,744, Article 66 part 2. See also **Addendum 1, Section 1, Question 35**.

SLD Health Impact

The Project owner shall take responsibility for ensuring compliance with health and safety regulations, in order to prevent any possible risk to health and physical integrity for the inhabitants of San José Maipo as well as the persons working on the Project.

SLD.03 Acoustic

In the field of Environmental Impact, specifically acoustic impact, the Project Owner has conducted a wide-ranging study to estimate acoustic emissions generated during the construction of the PHAM. For more information on the acoustic impact of the PHAM, and methodologies, modeling techniques, and actions to be taken to minimize such impact, please see **Annex 30 of the EIS** and **Section II, Question 8 in the Addendum**.

Plans for blasting activities, specifically including the frequency, quantity, timing, and work periods of blasting, will be determined on site in accordance with the characteristics of each works activity and work site. Regarding works activity scheduling, priority will be placed on completion of surface works during the daytime (8:00-21:00 hrs.); for blasting activities, plans call for an information program at the time of the activity, defining and clarifying the periods when noise-producing activities will take place, in order to integrate the community into efforts towards the completion of the Project.

Another point worthy of emphasis is that the work sites (tunnel excavation, access windows, and entrances/exits) will not be sited close to settlements, thus preventing most of the potential

acoustic impact that could be caused by the PHAM.

Wildlife rescue will be conducted through animal rescue activities based on the trapping of reptiles and amphibians before explosives are used, before service tracks are built, and before the modification of river flow.

Finally, and in order to comply with the requirements set forth above, the Project Owner shall be subject to:

1. Supreme Decree 146 (Establishing Standards on the Emission of Nuisance Noise Generated by Fixed Sources) establishing maximum permissible sound pressure levels, corrected according to technical criteria to evaluate and classify nuisance noises generated by fixed sources affecting the community, such as industrial, commercial, leisure, and artistic activities.
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For more information on the acoustic impact of the PHAM, and regulations (Chapter 6 of the EIS), mitigation measures, methodologies, modeling techniques, and actions to be taken to minimize such impact, please see Annex 30 of the EIS, as mentioned above.

Finally, in order to verify the effectiveness of the mitigation measures taken, noise monitoring will be conducted at 8 sensitive points, following the procedure established in MINSEGPRES Supreme Decree 146/97, in order to verify compliance with the maximum permitted limits for sound pressure level (see details in **Chapter 8 of the EIS, Section 8.2.2**).

Remark N° 96 Blasting

The location, duration, quantity, and frequency of blasting should be specified for all sectors.

Thematic responses

RSG Risk

The Project Owner possesses a general risk prevention strategy that imposes certain measures on the Project during its different stages of advance. This strategy features the following components:

- a) Measures incorporated into the Project's engineering design.
- b) Systematic verification of compliance with applicable regulations
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For further information on each of these points, please see **Chapter 7 of the EIS**, which specifies the **Environmental Management Plan**, the **Risk Control and Prevention Plan** designed for the Project, the safety measures to be adopted in light of the risks identified, and, finally, the **Accident control plan**, to be activated in the event of the failure of the preventive measures taken by the Project Owner. Furthermore, **Annex 32 of the EIS** presents the **Risk and Contingency Prevention Plan** for contractors.

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located close to the entrances of the tunnels that are to be constructed using the traditional drill and blast excavation technique (**Section 6.4.1.2 and Section 6.4.1.3 of the EIS, and Section 6, Question 26 in the Addendum**). At surface locations in areas where tunnels are to be excavated using the traditional method, no vibrations will be caused that could lead to risks of landslides, rock falls, and landslips resulting from the construction of the tunnels, because these excavation techniques will be used at a great depth below the surface.

Noise from blasting will only be audible during the opening of the ends of the tunnels. Once inside the tunnels, excavation works (including detonations) will not be audible, and therefore will not constitute a significant source of noise, and audible blasting will therefore only occur while the ends of the tunnels are being excavated. It is estimated that there will be 2 or 3 detonations per day at each work site. Based on these

levels, added to the background noise in each area, it was determined that noise will not rise above the maximum levels permitted under MINSEGPRES Supreme Decree 146/97. For more information on this topic, see **Section 6.4.1.2 of the EIS** and **Section 8.2.2 of the EIS**, which describe the noise and vibration monitoring program associated with the blasting activities, as established in **Section 6, Question 41 of the Addendum**.

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With regard to safety measures planned applying to the handling and storage of explosives, specified in Annex 32 of the EIS, regulatory stipulations for risk prevention and emergency control are provided that will apply to all contracting of works and/or services by Gener, in compliance with the requirements set forth in Law 16,744, Article 66 part 2. See also **Addendum 1, Section 1, Question 35**.

Remark N° 97

Labor Hiring

The Project Owner overestimates job creation, whereas the contractor and not the company itself shall be in charge of hiring. Gener should:

- * Quantify the amount of labor that it shall hire in the district.
- * Describe the positions to be filled.

* Establish a binding agreement between the Project Owner and the Municipal Government whereby Gener agrees to source 100% of the persons who have registered at the labor brokerage office.

Thematic responses

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.01 Jobs in the District

Local labor availability is estimated based on figures from the Labor Brokerage and Information Office. This information will be made available to construction contractors so that they can preferentially hire local workers. According to information compiled at the Project Office in San José de Maipo, the project has registered a total of 980 potential project workers, of whom 390 are unemployed, broken down as follows:

Mine workers:	105
Carpenters, Builders, and Rebar Layers:	157
Heavy Machinery Operators:	131
Non-specialized day laborers:	39
Drivers:	87
Specialized technical personnel:	60
Welders:	26
Foremen and supervisors:	7
Graduate professionals:	20
Cleaning, security, and canteen workers:	120
Administrative personnel:	91
Other, misc.:	139

The average project workforce during the construction phase (5 years) is estimated at 2000 persons, and during the Citizen Participation process the company has agreed to ensure that an average of at least 500 local persons will be on the payroll during the construction of the Project.

SOC.01.01 Requirements

In view of the characteristics and scale of the Project, personnel with specific qualifications will be required for the operation and maintenance of plant machinery and equipment, during the operations phase. Conversely, during the Project Construction Phase, it is projected that labor requirements will create jobs not only for mining workers, but also for machinery operators, drivers, and both skilled and unskilled construction personnel, the latter working mainly as day laborers and assistants.

The population of the Project's area of direct influence has been found to possess levels of training and specialization (occupation as defined under the CIIU code) that shall permit them to access both skilled and unskilled work positions created by the Project.

SOC.01.02 Working conditions

To date no schedule exists specifying labor requirements for the full duration of the construction phase. Detailed information specifying jobs created under average and peak labor requirements, broken down by labor requirement dynamics for each encampment, will only be available once the Project Owner has tendered the works contracts.

During the operations phase, it is expected that personnel requirements will amount to approximately 80 positions available, required for power plant operations and maintenance activities. Unlike work positions created during the construction phase, the jobs created in the operations phase will be permanent (EIS, Chapter 6, Section 6.4.2.4).

The Project Owner will provide for coordination between the construction works contractors, the Labor Brokerage Office, and the Municipality of San José de Maipo, regarding local labor required and jobs sought. The PHAM has accepted a commitment to incentivize works contractors to prioritize local contracting of labor required.

No prior training is planned in advance of the Construction Phase. However, such training will form part of the programs implemented in the more advanced phases of the project.

Remark N° 99 Supply Purchase Agreements

The Project Owner overestimates the benefit that will be generated for the community through the purchase of supplies and the presence of 20 encampments.

The Project Owner should enter into a binding agreement with the SJM Chamber of Commerce and Tourism, agreeing that all supplies required in the functioning of the encampments shall be acquired in the district.

Thematic responses

Specific response

The Project owner is not able to agree to this request because it goes against the concepts of free competition, and it is also unable to oblige contractors to purchase their supplies in the district.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social

Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment.

By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.05 Promoting entrepreneurship

The company has agreed to use its **Fundación Maitenes** foundation to set aside an **annual fund over a 10 year period starting in 2010**, to support local residents who formulate tourism development business plans for implementation in the area. These projects will be financed through funds open for competitive tenders; submissions will be evaluated on their own merit by a council of community representatives, which will select which projects will be funded. The initiative to be implemented by the Fundación Maitenes may be linked to projects in progress run by public institutions and services in the district, related to the two lines of action that the foundation has agreed to support. This linkage may help to strengthen state-run initiatives and foster sustainability over the course of time for the actions supported by the foundation, during the period in which the program is active.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district. In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district. During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. In parallel, the study investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 100**Irrigation** **User**
Communities

The Project Owner should attach written consent by the "El Manzano Channel" and "Maurino Channel"

Thematic responses

Specific response

The Project Owner reiterates its commitment to ensuring that necessary infrastructure exists in the river to permit water to enter the channels at all times, in accordance with the rights granted and the availability of the river throughout the life of the PHAM project.

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water**rights**

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in
Chapter 2 of the
EIS.

AGU.02.01**Irrigation**

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02
channels**"Hanging"**

shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

Remark N° 101 El Manzano EIS

The EIS presented by Gener does not include impact that will be generated by the PHAM at El Manzano.

* The EIS should include:

* Identification, prediction, interpretation, mitigation plan, and evaluation of the impact that will be caused, particularly with regard to irrigation systems.

Thematic responses

Specific response

The Project Owner reiterates its commitment to ensuring that necessary infrastructure exists in the river to permit water to enter the channels at all times, in accordance with the rights granted and the availability of the river throughout the life of the PHAM project.

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see **Table 2.3.4**

in Chapter 2 of the EIS.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that is, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact

shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of**

flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum.**

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Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility

(Addendum, Section 5, Question 2).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station Northing	Coordinates (UTM) Easting
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Remarks and Responses

Alto Volcán	Stream gauge station La Engorda Stream Bridge	406,157	6,259,100
Alto Volcán	Rain gauge station El Volcán River Bridge (Volcán	460,487	6,358,143
Alto Volcán	Control Station La Engorda Intake	407,468	6,259,751
Alto Volcán	Control Station Las Placas Intake	406,780	6,260,782
Alto Volcán	Control Station Colina Intake	407,181	6,260,081
Alto Volcán	Control Station El Morado Intake	405,768	6,261,231
Yeso River	Rain gauge station PBN (15)	391,504	6,262,449
Yeso River	Control Station El Yeso Intake	399,666	6,272,077
Colorado River	Stream gauge station El Sauce	380,449	6,287,261
Colorado River	Intake control station Colorado River	389,063	6,292,501

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 102

Restrictions Placed on the Usage of Water Rights in the Yeso River

- * Gener holds rights over water in the Yeso River amounting to 15 m³/sec. These rights were granted without ecological flow rate requirements. The Project plans to abstract 15 m³/sec Of water 700 m downstream of the reservoir.
- * Although the original rights acquired do not contain a stipulated ecological flow rate, this measure should be imposed by the SEIA as a mitigation measures - that is, a restriction on the usage of the rights held.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively. Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 from the year 1990, in the Public Registry of Water Usage Rights, maintained by the Public Water Registry (Catastro Público De Aguas) (**see the Addendum, Section V, Question 24, Part vi**).

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4 in Chapter 2 of the EIS**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating

in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of

Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

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With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

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The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán	Stream gauge station	6,259,100
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1) **Chapter 3 of the EIS** provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;

- The ways in which the Project will ensure compliance with these regulations. The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

PRO.O 1.01 Compensation

The concept of compensation refers to the act of indemnifying damages or harm caused. Within the framework of the EIS, the Project Owner has issued a proposal to the competent authority regarding a suite of environmental management measures aiming to minimize, compensate, and restore the Project's impacts, making their implementation sustainable (Chapter 6 of the EIS).

In this regard, compensation is understood to be included in the spirit or end goal of the environmental management measures proposed by the Project Owner, following the evaluation of the direct and indirect effects of the PHAM on each of the environmental components stipulated in Supreme Decree 95, SEIA Regulations.

Remark N° 103

Tourism

- * Given that, in view of its characteristics and natural monuments, the Cajón del Maipo valley has been declared a ZOIT Zone of National Interest, the Project Owner is requested to analyze and evaluate to what extent the impacts to be generated by the PHAM in the area subject to intervention are compatible with the district's role as a tourism destination.
 - * The Project Owner must identify the current and potential tourism demand in the region, in both qualitative and quantitative terms.
 - * Determine tourism service availability in the context of demand.
- * Describe and classify the tourism companies with special interests considered in the district, and the promotion of tourism service provision in the area.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative,

that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **TUR Tourism Scenery**

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.01 River sports

During the operations phase, the activities of the PHAM shall not directly or indirectly interfere with tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. Furthermore, the PHAM shall have no significant effect on boating activities on the Maipo River as a result of reductions in river flow rate; an analysis is presented in Annex 17 of the Addendum modeling a number of hydrological scenarios (1), concluding that the PHAM shall not affect the current situation in rafting and kayaking activities conducted in the area between San Gabriel and San José de Maipo.

In order to establish an analysis comparing the current Maipo River boating situation with predictions for the situation with the Project operational, the variables of flow rate, river width, and water depth were modeled, as valid indices to establish conditions for boating activities on the Maipo River.

This analysis showed that the Project shall not interfere with tourism activities conducted on the Maipo River, in view of estimates that in a dry year, the magnitude of variations in flow rate and water depth will not cause interference with boating activities.

For more information, see **Annex 17 of Addendum 1**.

- (1) The hydrological analysis used to evaluate reductions in flow rate is based on a statistical record going back 50 years, thus ensuring that seasonal and annual variations are incorporated into the analyses conducted.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business

initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 104

Ecological flow rates

- * The ecological flow rate should be defined by the DGA, not by the Project Owner
- * The point where these flow rates is to be measured and monitored should be sited at the mouth of the Colorado River.
- * Flow rate monitoring should include the participation of outside agencies, that are not hired by the company.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of

habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Q_e) approved by the DGA. In the case of the PHAM,

the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses. Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Eastings	Northing
	Alto Volcán	Stream gauge station	6,259,100
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 105

Decline in Flow Rates

*The impact to arise as a result of the decline in flow rates in the watercourses subject to intervention is not a cosmetic effect that is justified through the absence of tourism-related infrastructure.

*The Project Owner must provide documented background information forming the grounds for the prediction, identification, and interpretation of the impact that these actions shall cause.

* It should also describe the actions that it shall take in order to prevent or minimize all significantly negative effects.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.04 Monitoring and control of flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

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biological information necessary to preserve the aquatic organisms associated with the watercourses.

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The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project. For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	Stream gauge station		
	406,157		6,259,100
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For more information, see **Annex 17 of the Addendum**.

Remark N° 106 Impact in Watercourses Subject to Intervention

The Project Owner should take into account variables arising as a result of the formation of flat, open watercourses at a level closer to the surface. Temperature increased from sunlight, loss of water through evaporation, and the process of eutrophication can arise as a result of these conditions.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally

complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Q_e) approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

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Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	Stream gauge station		406,157
	La Engorda Stream Bridge		6,259,100
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 107 Transfer of Water Rights

The approval of transfer of title over water rights should be subject to the maintenance of ecological flow rates established by the DGA.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-

-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El

Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order

to maintain ecosystems. The operation and construction of the power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 108 CONAMA EIS

Given that the principal functions of CONAMA include "Administration of the EIS System", why is it permitted that a project be resubmitted when it intentionally omits, for instance, the impact to be generated in an entire settlement, as is the case in El Manzano? The same situation occurs regarding all of the watercourses subject to intervention under this project, the impact of which is described as a "cosmetic effect". In Law 19,300, Art. 2, Part c, it is stated that "**Environmental damage** [means] any significant loss, decline, detriment, or harm caused to the environment, or to one or more of its components", and the Project Owner has clearly recast environmental damage as a cosmetic effect in order to obtain its RCA. CONAMA, in its role as the administrator, should not only reject the resubmission of the PHAM under these conditions, it should also apply sanctions against this situation.

Thematic responses

OTR Other

This section relates to certain special situations that could not be categorized, or that are linked to specific requests, disqualifications, or situations that feature a clear political component, against either the environmental authority or the Project Owner.

OTR.02 CONAMA

Remark N° 109 **Citizen Participation Meetings**

At these meetings the Project Owner makes presentations, and these presentations are riddled with omissions, distortions, and bare faced lies. This fact has been observed by all of those present, including CONAMA, should be cause for drastic sanctions, and not aided by silence on the part of CONAMA.

Both the EIS system and the citizen participation meeting system should be subject to self-assessment, in terms of efficiency and transparency.

Thematic responses

OTR Other

This section relates to certain special situations that could not be categorized, or that are linked to specific requests, disqualifications, or situations that feature a clear political component, against either the environmental authority or the Project Owner.

OTR.02 CONAMA

Remark N° 110

Evaluation of the EIS System

An EIS should provide documented background information that can be used to predict, identify, and interpret its environmental impact and describe the action or actions that it shall take in order to prevent or minimize all significant adverse effects, so that, based on this background information, the project can be evaluated - in this case, by COREMA.

However, the PHAM Project Owner has not included this background information. (E.g. Impact at El Manzano); we must therefore assume that COREMA is to magically guess this impact, in order to make its observations on the project.

What happens if it is not capable of magical guessing? This clearly shows that the system as it is currently used is not efficient; that it is a system that can and should be improved, as the question of whether the correct information reaches those who are to make decisions regarding this project cannot be entrusted to the community.

- The inclusion of omissions, distortions, and falsified data in a EIS with the aim of obtaining an RCA, without accepting the cost of the impacts concerned, should be seen as a crime and sanctioned as such.

Thematic responses

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles,

70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.01 Regulations

The Project Owner shall comply with all legal environmental and sector-based regulations and requirements in force and applicable to the Project during the different phases of its development. The Project Owner has guaranteed compliance with the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and compliance with sector environmental permits.

Environmental regulations that apply to the Project have been identified based on its activities' potential environmental impacts affecting flora and fauna. The full extent of these regulations is included in **Chapters 3 and 4 of the EIS, and in Section 2, Question 1 in Addendum 1.**

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph

(EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

**PRO.02 EIS Additional and
Complementary Information**

In accordance with consultation procedures conducted by oversight services, further studies

and information have been incorporated into Addendum 1, which complements existing information provided in the EIS. Regarding ecological flow rates (**Annex 17**), cultural heritage (**Annex 14**) and the management of summer grazing areas (**Annex 6**).

Remark N° 111 1. Water Rights

The Project does not hold concessions for water rights at any abstraction point. A technical report exists, issued by the DGA, that concludes that it would not be possible to make available the water rights requested by Gener because there is no physical availability of water. How can a project of this nature be evaluated if it does not hold the required water rights? Will the Project attempt to take over water rights held by third parties?

Furthermore, a vast number of complaints have been lodged opposing these transfers of rights, in the Upper Maipo area and in the Colorado River.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in
**Chapter 2 of the
EIS.**

AGU.04 Water flow in rivers and

streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

Remark N° 113

3. Ecological Flow Rates and Baseline Studies

The Project establishes an ecological flow rate for the Colorado River at 0.6 m³/s. This flow rate is outside of the bounds stipulated by law, requiring (as a minimum) that the value must be 10% of average annual flow rate - in this case, 3.1 m³/s plus environmental demand.

Our studies indicate that downstream of the intakes, the Yeso River dries out, the La Engorda Stream dries out, the Colina Stream dries out, the Las Placas Stream dries out, the Morado Stream dries out, and the Colorado River is left with a minimal flow rate. Ecological flow rates are determined based on the Environment Base Law, Law 19,300, and respecting rights held by third parties.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

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Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications

in the natural state of the hydrological system relate to the presence of the Alfafal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of

Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	Rain gauge station		
	406,157		
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
Alto Volcán	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
Alto Volcán	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
Alto Volcán	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
Alto Volcán	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
Yeso River	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
Yeso River	PBN (15)		
Yeso River	Control station	399,666	6,272,077
Yeso River	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
Colorado River	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
Colorado River	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 114

4. Impact on Sediments and Aggregates

The potential aggregates production in the river basin will decline by around 3 million tons per year, which equates to more than 22% of total. This will affect the infrastructure of intakes, bridges, and water abstraction works, as well as the specific activity of aggregates extraction. If the authority has imposed a freeze on aggregates extraction permits in the first section of the Maipo River, how can it grant permission for a project that will extract 22% of all aggregates produced in the river basin?

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.05.01 Drinking water quality

The process of hydroelectric power generation does not affect the physical/chemical qualities of water. Additionally, the PHAM does not plan to implement regulation installations that retain sediment. Thirdly, downstream of the discharge point the natural river conditions are maintained with regard to flow rate and physical/chemical properties.

During the construction of installations to be located in watercourses, the free-flowing course of the river is maintained through the construction of diversions through pipes laid along the river course for such purposes, or through channels that divert all flow, allowing free water circulation with no effect whatsoever on quality (see **Section I, Question 28, in the Addendum**).

The Project owner shall not make use of the Lo Encañado Lake or water usage rights owned by Aguas Andinas S.A. for this Project, instead opting to forgo usage of these resources and to replace the role that would have been fulfilled by the Lo Encañado Lake with a forebay located on a widening of the Alfalfal II plant headworks, located in the Alto Aucayes area on the Colorado River Valley (for details, see **EIS 2.2.1**). The Lo Encañado area shall be assigned a status of controlled access area at all times: it shall not be subject to any intervention whatsoever. The Project Owner has made available a Water Quality Monitoring Program, with specifications for application during both the construction and operations phases. This program espouses a commitment to verify the effectiveness of environmental control measures designed to minimize the effects of works construction activities during the construction phase.

For further information on the Monitoring Program, see **Sections 8.2 and 8.3 in**

Chapter 8 of the EIS.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfal Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on

background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity. It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence. Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area. The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (AGU.06.01), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity. Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence. Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted. It can be concluded that the Maipo River system can be managed such that, With the Project operational, present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them. Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

AGU.06.03 Maipo River Sand Production

With regard to the extraction of aggregates in the Maipo River, during the operations phase of the PHAM, the Project will not modify current natural sediment (aggregates) transport dynamics occurring in the river. In effect, under the natural dynamics, sediment transport takes place mainly in the months of November, December, and January, as a result of snow and ice melt in the high mountains, and it is during this season that variations in flow rate in the Maipo River caused by the project stand at their lowest levels. The same behavior applies to winter season rises in river level. It must be pointed out that the PHAM returns water to the Maipo River in the Las Lajas area, located upstream of the El Canelo zone, and therefore downstream of this point the river's flow dynamics with the project shall be identical to those currently observed. It is of great importance to observe that currently, without the PHAM in operation, slightly downstream of the Las Vertientes area (in the La Obra stretch of the river), during certain times of the year flow rate in the Maipo River watercourse drops significantly, leaving the river bed dry, due to water abstraction at the following intakes: La Sirena Channel, San Carlos Channel, Independent Intake owned by Aguas Andinas, etc. Average water abstraction flow rates attributable to the main drinking water and irrigation intakes, many of which also make use of hydroelectric power as a byproduct, but discounting the effects of existing hydroelectric plants on these channels that discharge directly into the intakes, amounts to 113 m³/second, which is equal to the average annual flow rate in the Maipo River at Las Vertientes. Depending on water availability, the annual abstraction rate at these intakes varies between 78 and 164 m³/second. This situation clearly explains the high level of perturbation observed in the behavior of the Maipo River watercourse downstream of Las Vertientes, where the riverbed is dry except during periods of increased water level and in unusually wet years. It is for this reason that the Project Owner asserts that its activities will have no impact on the current situation in the sand extraction sites located on the Maipo River.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district. In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district. During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain

climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for

group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. The study also investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 115

5. Impact on aquatic flora and fauna

The Maipo Valley features an extremely high level of plant diversity, which has been studied by renowned botanists. Its aquatic plant and animal life also show a diversity of species described. No impact study has been conducted regarding high diversity aquatic plant and animal life, in an area that is designated by laws as a Priority Biodiversity Conservation Area.

Thematic responses

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles,

70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neoporteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo Spinolosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Lilolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed

will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

F&F.02.02 Mitigation

Aquatic flora and fauna

The Project calls for a suite of multi-purpose environmental management measures that aim to minimize its effects on living organisms, including: minimization of watercourse areas to be subject to intervention by prioritizing such works for late summer and early fall seasons (period of lowest flow rates), the adoption of special precautions to prevent accidental spillages into watercourses (prohibition of the storage of lubricant drums in or near watercourses, etc), and permanent maintenance of ecological flow rates.

For more detailed information, including technical documentation that complements the information described above, see Annex 17 of the Addendum.

Terrestrial Flora and Vegetation

In order to prevent and/or minimize the Project's effects on plant life, it plans to adopt a number of integrative measures: micro-routing in advance of starting work on-site, in order to identify specimens of plants listed in any conservation category and subject to impact; compensation with the planting of 10 specimens for every one destroyed, in the case of non-woodland species listed for conservation; implementation of a woodland management plan applicable to woodland areas, which describes its measures in accordance with Article 5 of the Woodland Law; implementation of vegetation restoration plans at muck disposal sites, encampments, artificial slopes, and tunnel access terraces (EIS, Annexes 7 and 29). More in-depth information on complementary measures is provided in Annex 6 of Addendum 1.

Terrestrial fauna

Specific wildlife environmental management measures have been proposed for each particular species, taking into account prior experience in the success of these measures in similar projects. These measures will be implemented in continual coordination with the Servicio Agrícola y Ganadero. Principal measures include: capture of individuals belonging to species of conservation interest for rescue and relocation; controlled perturbation actions; and habitat replacement. Other measures are based on the use of signage, training for Contractors, and contractual requirements for on-site supervision (see details in Section 6.4.1.6 of the EIS).

See Annex 4 of the Addendum for the native wildlife rescue and relocation plan.

Remark N° 116

6. Sustainability in the Maipo River Basin

The Company does not hold the corresponding water rights, and the Baseline studies are therefore not valid. The Project does not comply with the Environmental Impact Assessment System. The company does not recognize the impacts that shall arise as a result of the extraction of water resources. The Project is not capable of generating 530 MW. Data studied indicate that the company does not possess the water resources necessary to operate the Project, and does not hold corresponding water rights.

The Gener PHAM Project is not compatible with the sustainability of the Maipo River Basin.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS.**

This section presents information characterizing the basins and tributaries of the Volcán,

Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex 13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS.**

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

Remark N° 117 Sediments and Aggregates Transported by the Maipo River

As a result of water abstraction in the higher reaches of the river basin, Annex 20 of the Environmental Impact Study indicates that there will be a decline in the transport of aggregates by the river, and in its capacity to transport sediment. What impact will this situation have on the river's sandbanks, and on the extractions of aggregates where legal concessions exist for this activity? This situation is a threat to legally constituted rights, and to sources of employment related to the extraction and sale of aggregates for use in construction. Many families living in San José de Maipo have traditionally made their living through this activity and, with rights to do so legally constituted, continue to do so.

This impact on the resources is **NEGATIVE AND IRREVERSIBLE** (implying their destruction) and therefore must be taken into account.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.06 Sediments

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**Chapter 6.1 of the Sedimentation Study** presented in **Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.03 Maipo River Sand Production

With regard to the extraction of aggregates in the Maipo River, during the operations phase of the PHAM, the Project will not modify current natural sediment (aggregates) transport dynamics occurring in the river.

In effect, under the natural dynamics, sediment transport takes place mainly in the months of November, December, and January, as a result of snow and ice melt in the high mountains, and it is during this season that variations in flow rate in the Maipo River caused by the project stand at their lowest levels. The same behavior applies to winter season rises in river level.

It must be pointed out that the PHAM returns water to the Maipo River in the Las Lajas area, located upstream of the El Canelo zone, and therefore downstream of this point the river's flow dynamics with the project shall be identical to those currently observed.

It is of great importance to observe that currently, without the PHAM in operation, slightly downstream of the Las Vertientes area (in the La Obra stretch of the river), during certain times

of the year flow rate in the Maipo River watercourse drops significantly, leaving the river bed dry, due to water abstraction at the following intakes: La Sirena Channel, San Carlos Channel, Independent Intake

owned by
Agua
Andinas, etc.

Average water abstraction flow rates attributable to the main drinking water and irrigation intakes, many of which also make use of hydroelectric power as a byproduct, but discounting the effects of existing hydroelectric plants on these channels that discharge directly into the intakes, amounts to 113 m³/second, which is equal to the average annual flow rate in the Maipo River at Las Vertientes. Depending on water availability, the annual abstraction rate at these intakes varies between 78 and 164 m³/second.

This situation clearly explains the high level of perturbation observed in the behavior of the Maipo River watercourse downstream of Las Vertientes, where the riverbed is dry except during periods of increased water level and in unusually wet years.

It is for this reason that the Project Owner asserts that its activities will have no impact on the current situation in the sand extraction sites located on the Maipo River.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. The study also investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 118

1. Water Rights

The Project does not hold concessions for water rights at any abstraction point. A report prepared by the Directorate General of Water (DGA) indicates that this water does not physically exist, and that if any rights come to be granted, the flow rate in question will not be known; therefore, the baseline study is not valid, as it is based on suppositions regarding flow rates.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see **Table 2.3.4** in **Chapter 2 of the EIS.**

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site

information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information,

see **Annex 17** of the **Addendum**.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

Remark N° 119

2. Impact on Production Activities: Tourism

The Project is designed to minimize impact on tourism infrastructure, with point classifications and in relation with highway-related issues. This activity's real-world contribution to the District must be identified, along with the way in which it will be affected by reductions in flow rates, damage to ecosystems, access to mountain areas, impact on the landscape from power transmission lines.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

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For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally

complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's

high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **ELE Electrical Installations**

The electrical installations presented in the EIS comprise the substation, to be located in the El Sauce area, the characteristics of which are to be found in **Annex 27 of the EIS**; given that the electricity transport layout (cabling and towers) is to be presented to the Environmental Impact Assessment System once all background information is available.

ELE.03 Transmission lines

In view of the project's location, close to Santiago, it is expected that the distance covered by the definitive cabling layout will be short, involving a minimum of sectors not subject to prior intervention. With regard to the specific location of the cabling layout, plans call for the use of the existing high tension power line used by the Queltehues, Volcán, and Maitenes Plants.

Once the layout of the high tension power line has been defined, the Project Owner will submit this plan to the Environmental Impact Assessment System, in accordance with legislation in force. In line with the development of the Compliance Plan for environmental legislation applicable to the Project, the General Regulations applicable in this instance are indicated below:

Decree with Force of Law N°4, dated 05 February, 2007, setting forth the Recast, Coordinated, and Systematized Text of the General Law on Electrical Services.

The General Law on Electrical Services governs the generation, transmission, distribution, and regimen of concessions and tariffs applicable to electrical energy, and the functions of the State with regard to these areas.

Supreme Decree N° 327, Regulations Regarding the General Law on Electrical Services

The Regulations Regarding the General Law on Electrical Services establish, in their 8th Article, that hydroelectric power plants, electrical substations, and transmission lines may be installed without making a request for a concession, when the interested party wishes. These concessions may be provisional (in order to study projects) or definitive. A definitive concession is granted by a supreme decree issued by the Ministry of the Economy, by order of the President of the Republic. Permits relating to electrical installations that do not require concessions are granted by the corresponding Municipal Governments.

For further information and analysis on the aforementioned regulations, with regard to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see **Sections 3.1.6 and 3.1.7 of Chapter 3 of the EIS**, where more detailed versions of this information can be found.

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3**, and **Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neopteris curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Liolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed

will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor.

(see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

TUR Tourism

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.01 River sports

During the operations phase, the activities of the PHAM shall not directly or indirectly interfere with tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. Furthermore, the PHAM shall have no significant effect on boating activities on the Maipo River as a result of reductions in river flow rate; an analysis is presented in Annex 17 of the Addendum modeling a number of hydrological scenarios (1), concluding that the PHAM shall not affect the current situation in rafting and kayaking activities conducted in the area between San Gabriel and San José de Maipo.

In order to establish an analysis comparing the current Maipo River boating situation with predictions for the situation with the Project operational, the variables of flow rate, river width, and water depth were modeled, as valid indices to establish conditions for boating activities on the Maipo River.

This analysis showed that the Project shall not interfere with tourism activities conducted on the Maipo River, in view of estimates that in a dry year, the magnitude of variations in flow rate and water depth will not cause interference with boating activities.

For more information, see **Annex 17 of Addendum 1**.

- (1) The hydrological analysis used to evaluate reductions in flow rate is based on a statistical record going back 50 years, thus ensuring that seasonal and annual variations are incorporated into the analyses conducted.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the

possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

TUR.03 Visual impact

The Project Owner has conducted a study to characterize the landscape of the area in which

the Project is to be located, taking into account esthetic and perceptual considerations and emphasizing the characterization and appraisal of the issues of visibility, quality, and visual fragility of the landscape.

In terms of Landscape Alteration or Landscape Impact associated with this infrastructure project, potential effects are classified as either limited duration - generally applying during the construction phase - or permanent, for effects that shall persist during the operations phase and continue throughout the working life of the Project. A qualitative methodology is used to study these effects, whereby the first phase consists of identifying sources of visual impact, and the second phase relates to identifying and classifying environmental impacts.

As a general rule, it is assumed that impact on the landscape during the construction phase shall be temporary, mainly due to the transitory nature of the sources of impact, the low level of prior human activity in certain areas, and the relatively low level of physical and visual accessibility of a significant proportion of the area subject to intervention.

As most of the Project construction works will be situated underground, during the operations phase the main visual signatures of its existence will be the intakes and access roads.

For further information on the methodology used for landscape impact assessment, see **Chapter 6, Section 6.1.4.10 of the EIS, and Annex 17 of Addendum 1.**

Remark N° 122 Difference of US\$100,000,000

If the Project has reduced its area of influence, why have the costs risen by US\$ 100,000,000 (one hundred million dollars) over and above the costing for the original project? This is a very large difference to be an error in calculation, and therefore **I want to know what this money will be used for, and who will receive this money?** As, during the citizen participation process, the company stated that everything about this project is transparent, please provide transparency regarding the money that the project is donating and giving away, and which funds belong to the project itself

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term

mutually beneficial relationships between the project and its surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

Remark N° 123 Saving Us from an Energy Crisis

In its arguments in favor, the company indicates that it intends for this project to save the country from an energy crisis. My question is: **does the company really believe that it will be able to save the country from an energy crisis with this project, as it indicated in its meeting with local residents? Or is it only saying this so that people see a solution to this problem, and finally choose to support the project, even though the statements made at the meetings with citizens will not be proved true? Will it or will it not save the country? Please do not reply that it is just a contribution; answer yes or no.**

Thematic responses

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

Remark N° 124 Landscape Change and Change in Water Composition

Does the company really believe that, by taking water from the Upper Maipo River, allowing only fine sediment to pass, and discarding coarser material into the natural watercourse, it will not change the scenery of the Upper Maipo River - once the river is left without the capacity to transport this sediment, rather allowing it to build up over the years? And the composition of the water?

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum.**

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

Remark N° 125 Drinking Water in San Alfonso and at Other Sites

Can the company Gener offer assurances that it will not affect the wells that supply drinking water to the town of San Alfonso when part of the river dries out, or other wells in the area, through effects on groundwater?

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in
**Chapter 2 of the
EIS.**

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.03 Underground water

Underground water will not be affected in any way by the operation of the Project. This is the case because the underground water flow capacity in each sector of the aquifer associated with the Maipo River is much lower than the minimum flow running through each section of the river, and therefore under all circumstances the aquifers shall remain saturated. Thus, underground water sources present in the area shall also not be affected.

The PHAM plans to construct 70 km of tunnels, of which approximately 50 km correspond to headworks or hydraulic pressure tunnels, the remainder being access tunnels for use during construction of the project and for subsequent operation of the power plants (see **EIS Chapter 5, Section 5.3.5.3**).

Most of these tunnels have been designed to operate at variable internal pressures, with a maximum achieved at certain points of a little more than 450 m. The design requirement for these tunnels is that the lower limit of principal compression in the surrounding rock medium is always less than the operating pressure, such as to maintain a sufficient safety margin to prevent alterations in natural permeability dynamics through hydrojacking. In areas where this design principle is not guaranteed, the Project plans to install impermeable tunnel linings (**EIS, Annex 45.4**).

During the excavation of these tunnels, it is possible that the work front may have to pass through permeable rock strata - leading to seepages of water into the tunnel, the magnitude of which will depend on the permeability of the rock, the depth of the tunnel, and the level of the water table. In some areas, tunnel wall treatments may have to be applied in order to prevent water transfer into or out of the headworks tunnels.

The Project does not plan to make use of any water seepages that may arise, in the generation of electricity. Additionally, the overarching design principles underpinning the Project are oriented towards limiting seepages during construction, in order to establish suitable conditions for efficient tunnel excavation activities. The same principle applies to methods to limit the infiltration of water from the tunnels into the rock mass, thus avoiding water loss during operations.

Additionally, these procedures guarantee that any groundwater that may intercept the tunnels

shall suffer no change in its natural hydrological dynamics, or impact on any

foreign components or water other than the water entering the system (**EIS, Annex 45**). Special attention will be paid to the quality and characteristics of any water that may eventually return to the natural water system through the tunnel access windows, and therefore construction contracts will specify measurements that must be made and the treatment that shall be required for subsequent disposal of such water, in order to ensure compliance with the quality requirements for water discharge into natural watercourses, under regulations currently in force.

In the event of seepages of water at high temperature and possible acidic composition, it is important to make clear that in general there shall be no major differences in the methods used to render the tunnel walls impermeable. During all site surveys conducted, research boreholes and surface geological maps produced to date applying to the areas through which the tunnels will pass, no evidence whatsoever has been found to lead to any prediction of the presence of water at high temperatures, or with mineral or acidic contamination. As additional background information, during the construction of the Alfalfal Plant - with the excavation of 35 km of tunnels - no events similar to those indicated above occurred. Notwithstanding the above, the specification establish that, in locations located close to potentially critical areas, the contractor must drill survey boreholes of between 25 m and 30 m in length ahead of the tunnel work front, in order to gain early warning of seepage problems and thus be able to apply impermeable tunnel wall treatments as required. See **EIS, Annex 45.4**.

Remark N° 126 Insurance

Will the company Gener contract the insurance policies that any project of this scale should hold, such as agricultural insurance, and policies covering all risks to local residents; or, what policies will be held?

Thematic responses

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly

frequented, minimizing their visual impact.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1)

Chapter 3 of the EIS provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

PRO.01.02 Insurance

Notwithstanding the fact that legislation in force does not impose an obligation on the Project Owner to contract insurance, it is the policy of the Risk Management Department of the Gener group to maintain civil responsibility insurance policies covering damages to third parties or injuries to its personnel and damage to its property, covering both the construction and operations phases of its Projects. Notwithstanding the above, in the event that activities related to the construction or operation of its installations for the PHAM Project cause harm to third parties, the liability and the amount awarded as compensation for damages suffered must be determined by the courts.

SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

SUE.03 Agriculture

It should be pointed out that the main irrigation channels fed from the Maipo River have their intakes located downstream of the La Sirena Channel intake, which itself is located approximately 1 km downstream of the Las Lajas Power Plant discharge spillway.

Only the Maurino and Manzano Channels have their intakes located on the Colorado River. In the case of the channels that draw water from the Colorado River, the Project Owner has agreed to construct such additional works as are required at the channel intakes, and to accept responsibility for maintaining these installations.

The Project shall have no effect on the availability of water resources used for irrigation, as the points where the PHAM will capture and discharge the water that it uses are all located upstream of the area in question.

Remark N° 127 Metropolitan Master Plan

Will the Project Owner comply with the Metropolitan Master Plan - yes or no?

Thematic responses

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly

frequented, minimizing their visual impact.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1)

Chapter 3 of the EIS provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

Remark N° 128 El Morado Natural Monument

Will the Project pass underneath the El Morado Natural Monument or any similar site - yes or no?

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

PRO.03.02 Tunnels

The majority of the Project is planned for installation underground. The general characteristics of the tunnels are described in Chapter 2 of the EIS, Table 2.2.5 (for detailed geological information on the path taken by the tunnels, see Annex 46 of the EIS).

For an evaluation of the impact and environmental management measures associated with underground installations, see Chapter 6 of the EIS.

Annex 45 of the EIS, Hydro-Geology of Underground Works, presents a general description of the geological conditions that are expected to be found along the lengths of the tunnels; expected permeability based on geological knowledge and hydro-geological conditions in the area, incorporating experience gained during the construction of tunnels for the Alfalfal Plant, which has been operative for more than 17 years; as well as a description that includes the design of the tunnels, providing a brief explanation of the methods to be used to reduce and control water seepage.

With regard to the impact of the path taken by the tunnel passing underneath the El Morado Natural Monument, and measures to be taken to respect the area, see Section I, Responses 4, 5, and 6, in the Addendum.

Remark N° 129 Installed Power

Please state what will be the real power generated by the project. Also, state whether charges will be levied for installed power capacity. Given that in this case there is a great difference between the power generating potential of the Project's hydrological characteristics and the power capacity being installed, what is the reason for the magnitude of this difference, if sufficient water resources are not available?

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS**.

This section presents information characterizing the basins and tributaries of the Volcán, Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex 13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS**.

ELE Electrical Installations

The electrical installations presented in the EIS comprise the substation, to be located in the El Sauce area, the characteristics of which are to be found in **Annex 27 of the EIS**; given that the electricity transport layout (cabling and towers) is to be presented to the Environmental Impact Assessment System once all background information is available.

ELE.03 Transmission lines

In view of the project's location, close to Santiago, it is expected that the distance covered by the definitive cabling layout will be short, involving a minimum of sectors not subject to prior intervention. With regard to the specific location of the cabling layout, plans call for the use of the existing high tension power line used by the Queltehues, Volcán, and Maitenes Plants.

Once the layout of the high tension power line has been defined, the Project Owner will submit this plan to the Environmental Impact Assessment System, in accordance with legislation in force. In line with the development of the Compliance Plan for environmental legislation applicable to the Project, the General Regulations applicable in this instance are indicated below:

Decree with Force of Law N°4, dated 05 February, 2007, setting forth the Recast, Coordinated, and Systematized Text of the General Law on Electrical Services.

The General Law on Electrical Services governs the generation, transmission, distribution, and regimen of concessions and tariffs applicable to electrical energy, and the functions of the State with regard to these areas.

Supreme Decree N° 327, Regulations Regarding the General Law on Electrical

The Regulations Regarding the General Law on Electrical Services establish, in their 8th Article, that hydroelectric power plants, electrical substations, and transmission lines may be installed without making a request for a concession, when the interested party wishes. These concessions may be provisional (in order to study projects) or definitive. A definitive concession is granted by a supreme decree issued by the Ministry of the Economy, by order of the President of the Republic. Permits relating to electrical installations that do not require concessions are granted by the corresponding Municipal Governments.

For further information and analysis on the aforementioned regulations, with regard to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see **Sections 3.1.6 and 3.1.7 of Chapter 3 of the EIS**, where more detailed versions of this information can be found.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

Remark N° 131 Improper Legal Framework

How is the future of the PHAM predicted for the next 50 years, within the current legal framework for energy?

Thematic responses

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

Remark N° 132 Improper Legal Framework

How will the PHAM continue to maintain dialog with the community, with no legal framework?

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes

Maitenes Foundation agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

Remark N° 133 Project Incomplete

Transmission

Thematic responses

ELE Electrical Installations

The electrical installations presented in the EIS comprise the substation, to be located in the El Sauce area, the characteristics of which are to be found in **Annex 27 of the EIS**; given that the electricity transport layout (cabling and towers) is to be presented to the Environmental Impact Assessment System once all background information is available.

ELE.03 Transmission lines

In view of the project's location, close to Santiago, it is expected that the distance covered by the definitive cabling layout will be short, involving a minimum of sectors not subject to prior intervention. With regard to the specific location of the cabling layout, plans call for the use of the existing high tension power line used by the Queltehues, Volcán, and Maitenes Plants.

Once the layout of the high tension power line has been defined, the Project Owner will submit this plan to the Environmental Impact Assessment System, in accordance with legislation in force. In line with the development of the Compliance Plan for environmental legislation applicable to the Project, the General Regulations applicable in this instance are indicated below:

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For further information and analysis on the aforementioned regulations, with regard to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see **Sections 3.1.6 and 3.1.7 of Chapter 3 of the EIS**, where more detailed versions of this information can be found.

Remark N° 134 Local Improvements

Creation of a foundation to continue the relationship between the community and the PHAM.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

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The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
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The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes

Maitenes Foundation agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

Remark N° 135 **Regional and Provincial Situation**

The position of the State regarding the role of the Project as part of the general perspective.

Thematic responses

OTR Other

This section relates to certain special situations that could not be categorized, or that are linked to specific requests, disqualifications, or situations that feature a clear political component, against either the environmental authority or the Project Owner.

OTR.02 CONAMA

Remark N° 136 Technological Changes

Of the lungs of the City

- The Project accepts (assumes) that technology will not change.

Thematic responses

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

SLD Health Impact

The Project owner shall take responsibility for ensuring compliance with health and safety regulations, in order to prevent any possible risk to health and physical integrity for the inhabitants of San José Maipo as well as the persons working on the Project.

SLD.02 Atmospheric

Although the Project involves surface construction activities, which will lead to the emission of particulate matter, plans call for the implementation of a suite of mitigation measures that will result in a considerable reduction in emission, not only of the PHAM itself but also as against the baseline of current particulate emissions through the Project's area of influence. In addition to the above, these considerations should be evaluated bearing in mind the fact that most of the Project's works will be underground, not producing any emissions of particulate matter.

Conversely, given that most of the Project's works are to be located in high mountain areas, it can be stated that the prevailing ventilation conditions in this environment will facilitate the dispersion of dust, with a natural reduction in emissions during the winter season as a result of the additional moisture contributed by rain and snow precipitation.

For more information on emissions compensation measures, see **Annex 5 of the EIS**.

Remark N° 137

Guarantees

- Environmentalists state that this project will cause an environmental catastrophe
- The company AES Gener states that the impacts will be minimal

The question is as follows: does a baseline study exist in the EIS that presents a snapshot of the ecological and environmental situation (biomass, wildlife, relative humidity, etc.)?

If the "environmentalists" are right, what measures will be taken to "guarantee" continuity as against the baseline, with regard to our ecology and environment?

1. Quantity and quality of plant life
2. Quantity and quality of wildlife
3. Relative humidity characteristics

We are not "fortune tellers", projecting the project's "real" environmental impacts is not an exact science. Let's guarantee the District's environmental future.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.04.04 Monitoring and control of flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
Alto Volcán	Stream gauge station	406,157	6,259,100
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán		
Alto Volcán	Control Station	407,468	6,259,751
	La Engorda Intake		

Alto Volcán	Control Station Las Placas Intake	406,780	6,260,782
Alto Volcán	Control Station Colina Intake	407,181	6,260,081

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Alto Volcán	Control Station El Morado Intake	405,768	6,261,231
Yeso River	Rain gauge station PBN (15)	391,504	6,262,449
Yeso River	Control Station El Yeso Intake	399,666	6,272,077
Colorado River	Stream gauge station El Sauce	380,449	6,287,261
Colorado River	Intake control station Colorado River	389,063	6,292,501

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

F&F Biodiversity Impact Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempe Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neoporteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Lilolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals

will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).
No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

Remark N° 138

5% of the PHAM Project's earnings must be given to the District.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes

Maitenes Foundation agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

Remark N° 139 Reduction in Water Flow Rates

As I own land alongside the Colorado River, I need water to maintain environmental moisture.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in
**Chapter 2 of the
EIS.**

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

Remark N° 140 Tourism

Tourism demand, in qualitative and quantitative terms

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism

is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **TUR Tourism**

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.01 River sports

During the operations phase, the activities of the PHAM shall not directly or indirectly interfere with tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. Furthermore, the PHAM shall have no significant effect on boating activities on the Maipo River as a result of reductions in river flow rate; an analysis is presented in Annex 17 of the Addendum modeling a number of hydrological scenarios (1), concluding that the PHAM shall not affect the current situation in

rafting and kayaking activities conducted in the area between San Gabriel and San José de Maipo.

In order to establish an analysis comparing the current Maipo River boating situation with predictions for the situation with the Project operational, the variables of flow rate, river width, and water depth were modeled, as valid indices to establish conditions for boating activities on the Maipo River.

This analysis showed that the Project shall not interfere with tourism activities conducted on the Maipo River, in view of estimates that in a dry year, the magnitude of variations in flow rate and water depth will not cause interference with boating activities.

For more information, see **Annex 17 of Addendum 1**.

- (1) The hydrological analysis used to evaluate reductions in flow rate is based on a statistical record going back 50 years, thus ensuring that seasonal and annual variations are incorporated into the analyses conducted.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 141 Water Rights

Respect third party water rights, and ensure that the holders of such rights are respected in the long term.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services. For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4 in Chapter 2 of the EIS.**

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been

conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape. To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a

description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Eastings	Northing
	Alto Volcán		
	406,157		
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 142**Irrigation** **User**
Communities

El Manzano Channel and

Maurino Channel

Thematic responses

Specific Response

The Project Owner reiterates its commitment to ensuring that necessary infrastructure exists in the river to permit water to enter the channels at all times, in accordance with the rights granted and the availability of the river throughout the life of the PHAM project.

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water**rights**

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in
Chapter 2 of the
EIS.

AGU.02.01**Irrigation**

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources.

During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 **"Hanging"**
channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds,

shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

Remark N° 143 Hands Off the Colorado River

Robber barons, you don't mess with water, the natural world will make you pay for your impudence

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see **Table 2.3.4** in **Chapter 2 of the EIS.**

Remark N° 144 Water

The drying out of rivers and streams will certainly cause an impact on the environment and on families.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures

designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc. Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

Remark N° 145 Glacier and Natural Monuments

The damage caused in these areas will have disastrous consequences for tourism and on local residents.

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly

agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **TUR Tourism**

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 146 Job Creation

Supposed job creation effects are not a reality that will have any effect on the local population and community in the areas affected.

Thematic responses

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.01 Jobs in the District

Local labor availability is estimated based on figures from the Labor Brokerage and Information Office. This information will be made available to construction contractors so that they can preferentially hire local workers. According to information compiled at the Project Office in San José de Maipo, the project has registered a total of 980 potential project workers, of whom 390 are unemployed, broken down as follows:

Mine workers:	105
Carpenters, Builders, and Rebar Layers:	157
Heavy Machinery Operators:	131
Non-specialized day laborers:	39
Drivers:	87
Specialized technical personnel:	60
Welders:	26
Foremen and supervisors:	7
Graduate professionals:	20
Cleaning, security, and canteen workers:	120
Administrative personnel:	91
Other, misc.:	139

The average project workforce during the construction phase (5 years) is estimated at 2000 persons, and during the Citizen Participation process the company has agreed to ensure that an average of at least 500 local persons will be on the payroll during the construction of the Project.

Remark N° 147 Education

The Foundations as a consolation prize to the community to generate a favorable impression of the company.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

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Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of

the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

CAL.02 Education

A goal of the Maitenes Foundation relates to education for children and young people against the backdrop of the natural environment (for more information on the goals and achievements of the Foundation, see Annex 26 of the EIS).

Gener firmly believes that contributions to the technical and vocational education and training of young people must keep sight of real employment possibilities. Therefore, as a first initiative it has earmarked resources for an education improvement project in the district, which will contribute to establishing education management for the restructuring of the school curriculum and professional technical capacity building, taking into account the features needed to boost local employability. Based on information and recommendations from this study, Gener, acting through the Maitenes Foundation, will undertake a Capacity Building for Employability Program fundamentally oriented towards those whose family, social, or economic situation has barred them from completing their education and training, or acquiring the skills needed in order to find work.

Remark N° 148 Environmental Impact

The fact that a tunnel passes beneath a glacier leads to irreparable damage to the area's ecosystem. It is also harmful to tourism in the area.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

**CAL.04 Fostering tourism
in the area**

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **PRO The Project**

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

PRO.03.02 Tunnels

The majority of the Project is planned for installation underground. The general characteristics of the tunnels are described in Chapter 2 of the EIS, Table 2.2.5 (for detailed geological information on the path taken by the tunnels, see Annex 46 of the EIS).

For an evaluation of the impact and environmental management measures associated with underground installations, see Chapter 6 of the EIS.

Annex 45 of the EIS, Hydro-Geology of Underground Works, presents a general description of the geological conditions that are expected to be found along the lengths of the tunnels; expected permeability based on geological knowledge and hydro-geological conditions in the area, incorporating experience gained during the construction of tunnels for the Alfalfal Plant, which has been operative for more than 17 years; as well as a description that includes the design of the tunnels, providing a brief explanation of the methods to be used to reduce and control water seepage.

With regard to the impact of the path taken by the tunnel passing underneath the El Morado Natural Monument, and measures to be taken to respect the area, see Section I, Responses 4, 5, and 6, in the Addendum.

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits

to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 149 Water

The Project for the New Hydroelectric Plants will cause a noteworthy decline in the quantity of water available for use in irrigation.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in
**Chapter 2 of the
EIS.**

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El

Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and**

Section IV, Question 5.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 150 Employment

The Project offers no concrete guarantees that new jobs will be created for the people who live in the area.

Thematic responses

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district. In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district. During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.01 Jobs in the District

Local labor availability is estimated based on figures from the Labor Brokerage and Information Office. This information will be made available to construction contractors so that they can preferentially hire local workers. According to information compiled at the Project Office in San José de Maipo, the project has registered a total of 980 potential project workers, of whom 390 are unemployed, broken down as follows:

Mine workers:	105
Carpenters, Builders, and Rebar Layers:	157
Heavy Machinery Operators:	131
Non-specialized day laborers:	39
Drivers:	87
Specialized technical personnel:	60
Welders:	26
Foremen and supervisors:	7
Graduate professionals:	20
Cleaning, security, and canteen workers:	120
Administrative personnel:	91
Other, misc.:	139

The average project workforce during the construction phase (5 years) is estimated at 2000 persons, and during the Citizen Participation process the company has agreed to ensure that an average of at least 500 local persons will be on the payroll during the construction of the Project.

Remark N° 151 Ecological flow rates

The ecological flow rates should be defined by the DGA, not by the Project Owner.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river

flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero

(0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 153 Decline in Flow Rates

The impact to arise as a result of the decline in flow rates in the watercourses subject to intervention is not a cosmetic effect that is justified through the absence of tourism-related infrastructure.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at

least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Q_e) approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently

subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

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The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	Stream gauge station		6,259,100
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 156
Impact in Watercourses Subject to Intervention

Increase in temperature from sunlight and other factors

Thematic responses

Specific response

The watercourses subject to intervention are not susceptible to significant impact regarding sunlight or increases in temperatures.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

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tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

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For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.04 Monitoring and control of flow rates and water levels

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Alto Volcán	Control Station Colina Intake	407,181	6,260,081
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Yeso River	El Morado Intake Rain gauge station PBN (15)	391,504	6,262,449
Yeso River	Control Station El Yeso Intake	399,666	6,272,077
Colorado River	Stream gauge station El Sauce	380,449	6,287,261
Colorado River	Intake control station Colorado River	389,063	6,292,501

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 157 Tourism

Given that the Cajón del Maipo valley has been declared a zone of national tourism interest, the Project Owner is requested to analyze and evaluate to what extent the impacts to be generated by the PHAM are compatible with this role.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **TUR Tourism**

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 158 Water

To dry out rivers is to leave the community without its main source of life.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

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It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that

will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a

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Remark N° 159 Education

The proposals do not always provide responses to the people's real education needs, by means of the foundations.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of

the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

CAL.02 Education

A goal of the Maitenes Foundation relates to education for children and young people against the backdrop of the natural environment (for more information on the goals and achievements of the Foundation, see Annex 26 of the EIS).

Gener firmly believes that contributions to the technical and vocational education and training of young people must keep sight of real employment possibilities. Therefore, as a first initiative it has earmarked resources for an education improvement project in the district, which will contribute to establishing education management for the restructuring of the school curriculum and professional technical capacity building, taking into account the features needed to boost local employability. Based on information and recommendations from this study, Gener, acting through the Maitenes Foundation, will undertake a Capacity Building for Employability Program fundamentally oriented towards those whose family, social, or economic situation has barred them from completing their education and training, or acquiring the skills needed in order to find work.

Remark N° 160
Environment of Natural Monuments

Environmental impact, affecting tourism, on natural reserves.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

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CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism

is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **F&F Biodiversity Impact**

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3**, and **Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neoporteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Liolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopus cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

TUR Tourism

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-

term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives

coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

**Remark N° 161
Employment**

Employment proposals and offers often lack necessary physical conditions, or are not in the interests of the community.

Thematic responses

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district. In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district. During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.01 Jobs in the District

Local labor availability is estimated based on figures from the Labor Brokerage and Information Office. This information will be made available to construction contractors so that they can preferentially hire local workers. According to information compiled at the Project Office in San José de Maipo, the project has registered a total of 980 potential project workers, of whom 390 are unemployed, broken down as follows:

Mine workers:	105
Carpenters, Builders, and Rebar Layers:	157
Heavy Machinery Operators:	131
Non-specialized day laborers:	39
Drivers:	87
Specialized technical personnel:	60
Welders:	26
Foremen and supervisors:	7
Graduate professionals:	20
Cleaning, security, and canteen workers:	120
Administrative personnel:	91
Other, misc.:	139

The average project workforce during the construction phase (5 years) is estimated at 2000 persons, and during the Citizen Participation process the company has agreed to ensure that an average of at least 500 local persons will be on the payroll during the construction of the Project.

SOC.01.02 Working conditions

To date no schedule exists specifying labor requirements for the full duration of the construction phase. Detailed information specifying jobs created under average and peak labor requirements, broken down by labor requirement dynamics for each encampment, will only be available once the Project Owner has tendered the works contracts.

During the operations phase, it is expected that personnel requirements will amount to approximately 80 positions available, required for power plant operations and maintenance activities. Unlike work positions created during the construction phase, the jobs created in the operations phase will be permanent (EIS, Chapter 6, Section 6.4.2.4).

The Project Owner will provide for coordination between the construction works contractors, the Labor Brokerage Office, and the Municipality of San José de Maipo, regarding local labor required and jobs sought. The PHAM has accepted a commitment to incentivize works contractors to prioritize local contracting of labor required.

No prior training is planned in advance of the Construction Phase. However, such training will form part of the programs implemented in the more advanced phases of the project.

Remark N° 162

Role of CONAMA and/or COREMA

Caring for the environment is the priority role of CONAMA, and this body therefore cannot approve the Project if it is unsafe, and given that the environment law does not specify reasonable limits on the usage of water (as shown by the ridiculous ecological flow rate proposed by AES Gener)(Why does the company establish the ecological limit)(and not you).

Thus, if CONAMA does not want to condemn the valley and its residents to misery, it must oppose the Project or impose LIMITS and CONDITIONS.

1. that the company must cede 5% of its profits to the Cajón del Maipo Valley, for social uses.
2. that it must occupy no more than 60% of river and stream flow rates in order not to cause environmental impacts.
3. that it must not prevent persons from entering high mountain areas (c.f. the case of Alfalfal I).

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at

least in part.

CAL Impact on Quality of Life

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CAL.01 Contributions to the community

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The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

OTR Other

Remarks and Responses

Remark N° 162 Page 3

This section relates to certain special situations that could not be categorized, or that are linked to specific requests, disqualifications, or situations that feature a clear political component, against either the environmental authority or the Project Owner.

OTR.02 **CONAMA**

Remark N° 164
Irrigation User Organizations, El Manzano Channel and Maurino Channel

In view of the drop in water flow in the Colorado River, irrigation user organizations will find it impossible to abstract the quantities of water to which they have rights.

1. The Project Owner should include the construction of such installations as shall be necessary to avoid this impact, and the commitment that has been expressed to defray all costs arising through the construction and maintenance of these installations.
2. The Project should include guarantees and compensation payable in the event that these organizations are rendered unable to abstract the water to which they hold rights.
3. The Project Owner should attach written consent by the “El Manzano Channel” and “Maurino Channel”

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project’s base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project’s EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project’s area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see **Table 2.3.4** in **Chapter 2 of the EIS**.

AGU.02.01
Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project’s area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 **“Hanging”**
channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

PRO.01.01 Compensation

The concept of compensation refers to the act of indemnifying damages or harm caused. Within the framework of the EIS, the Project Owner has issued a proposal to the competent authority regarding a suite of environmental management measures aiming to minimize, compensate, and restore the Project's impacts, making their implementation sustainable (Chapter 6 of the EIS).

In this regard, compensation is understood to be included in the spirit or end goal of the environmental management measures proposed by the Project Owner, following the evaluation of the direct and indirect effects of the PHAM on each of the environmental components stipulated in Supreme Decree 95, SEIA Regulations.

Remark N° 169

Precautionary Measures to Maintain Ecological Flow Rates

- * Precautionary measures should be indicated that will be taken to ensure the maintenance of ecological flow rates along all applicable watercourses and throughout the year.
- * The Project Owner should take into account variables arising as a result of the formation of flat, open watercourses at a level closer to the surface. Temperature increased from sunlight, loss of water through evaporation, and the process of eutrophication can arise as a result of these conditions.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4 in Chapter 2 of the EIS**.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known

as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow

velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included. In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	Rain gauge station		
	406,157		
	Stream gauge station		
	6,259,100		
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 171 Morales Stream - Maipo Valley Property

With regard to the Environmental Impact Study for the project "PROYECTO HIDROELÉCTRICO ALTO MAIPO file N° 105", presented by AES Gener S.A. to the environmental impact assessment system (SEIA), in conformity with the General Base Law on the Environment, Law 19,300 dated 1994, in representation of the owners of the property at Quebrada Morales, over the surface and underground properties of which a significant part of the project will pass; we wish to express:

The PHAM will install the new "Alfalfal II" power plant in the upper reaches of the Maipo River and shall make use of water from the upper reaches of the Volcán River and the Yeso River.

Most of the Project's installations shall be located underground, including the turbine rooms and headworks, as indicated in Project documentation, but the fact that the works are underground does not mean that they may not create prior impacts and destruction of surface land to which the Project has access.

The Project's access roads and water intakes constitute its main surface works and installations. Plans also call for the creation of a **Muck Disposal Heap** that will receive all material produced through the excavation of this tunnel.

The construction of the Alfalfal II Plant water discharge spillway implies the installation of the **Muck Disposal Heap** containing materials removed in the creation of this installation, and the installation of temporary or permanent encampments, as well as movement of persons or goods for a sufficient time to bring about the destruction of the area of great archeological and paleontological interest known as "EL VALLE DE LAS ARENAS", which forms part of the Quebrada Morales land holding owned by Messrs. Von Plate Harries.

This area known as the "**Valle Las Arenas**" is included in the National System of Protected Private Wilderness Areas (SNAPP), which is legally protected under Law 19,300.

Law 19,300 defines environmental damage as "any significant loss, decline, detriment, or harm caused to the environment, or to one or more of its components"

The term "environment" is understood to refer not only to natural elements but also to artificial and socio-cultural elements; Article 10 part p) requires the application of the environmental impact evaluation system to a number of classes of project, including the implementation of any works in any area placed under official protection, such as archeological and paleontological remains that, as a result of their characteristics, are protected under the National Monuments Law.

Under Chilean legislation, in the absence of a soil law or land law, and in view of the precarious treatment of cultural and scenic heritage provided under the General Urban Development and Construction Law, the environmental impact evaluation system takes on a role as a vital legal instrument that, operating under the precautionary principle, permits the reconciliation of due protection for goods belonging to cultural heritage and the execution of projects or activities that may form sources of environmental impact, with the aim of ensuring that irreplaceable sites such as those with anthropological, archeological, historic, and other classes of value causes them to be classed as natural and cultural heritage are granted special consideration in the evaluation that must be conducted for the project.

The El Alfalfal II Project, with its works located within the "**Valle Las Arenas**" area, and particularly the siting of the Muck Disposal Heap and the installation of an encampment with consequent movements of persons and vehicles, nonetheless plans for no measure to protect or prevent damage to the natural and archeological riches located at that site.

On the contrary, the project documentation refrains from making any mention of the "Valle Las Arenas" area. It does not indicate that these works will form the start of a process of irreparable damage, which will cause the archeological, paleontological, and natural sites such as wetlands, all located on the mountain pass to the "**El Morado Glacier**", shall no longer possess their original scientific and natural potential. Similarly, in the project documentation no protection or damage prevention measures have been presented for this important area, which rather contains incomplete background information that fails to specify such basic figures as the quantity of muck, in tons or cubic meters, derived from the construction of the tunnel and to be disposed of at the Muck Disposal Heap to be installed in that valley.

"**Valle de Las Arenas**" is recognized by the global scientific community, and certain members of this community have expressed their concern over the international installation, some of whom have expressed their concern over the installation of this project in that valley, with regard to which we refer to the report by geologist Christian Salazar Soto and Professor Doctor Wolfgang Stinnesbeck, a geologist and paleontologist, both members of the University of Heidelberg, Germany, in the *Informe de la Sociedad de Paleontología de Chile* as well as the municipal government of San José de Maipo - all of which publication warn of severe environmental damage to the area, and to which we claim a link as owners of the aforementioned land holding.

It has been the intention of the landowners to incorporate the "**Valles Las Arenas**" into protected national heritage in view of its enormous tourism potential, and its unique and irreplaceable archeological and paleontological remains. For this reason work has been conducted on this "**Private Protected Wilderness Area**" under the legal protection granted to private interests promoting the development of such areas for the development of sustainable projects, which, maintaining protection of their unique properties, can be the subject of top level tourism projects that bring great economic benefits to the area.

Any person interested in the "**VALLE LAS ARENAS**" can view its website: www.vallelasarenas.cl which provides all necessary information on its content and significance.

Finally, it is requested that all necessary reports relating to the temporary and permanent occupation of the Valle Las Arenas be requested, relating to the construction of the project, and providing detailed and precise specification of the area and volume of the muck disposal heap that shall remain permanently in this region; and furthermore, that an opinion be issued with regard to the mechanisms to be applied to the protection of existing wetlands and fossils in that area.

In view of the above, attention is hereby called to the destruction represented by works to be

conducted in the "Valle Las Arenas" in its role as a "**Private Protected Wilderness Area**", as well as the irreparable environmental risks to be visited upon the area, which will result in any

other environmental or tourism project in the area becoming unfeasible, thus impeding the successful completion of sustainable projects that respect the environment.

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

AGU.01 Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum 1**.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material
- b) creation of a viewpoint
- c) fossil trail

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

ARQ.03 Scientific research

The scientific and cultural importance of the paleontological resources present has been recognized by the PHAM Project Owner, leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the Project Owner has taken on a commitment to enhance knowledge of the area before starting planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may be detected during the course of construction under the PHAM. These activities will contribute not only to the maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of

materials or components present.

For more information, see **Annex 14 of Addendum 1**.

MAR Muck

The PHAM plans to construct approximately 70 km of tunnels. The excavation of these tunnels will generate inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of inert material produced in road building and the construction of buried conduits.

This muck material will be deposited in the 14 muck disposal heaps that the Project plans to create. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria. For more information, please see **Annex 6 of the EIS** and **Annex 3 of the Addendum**.

MAR.01 Regulations

The Project Owner has made available a Management Plan for "Project Muck Disposal Heaps", which contains information on the technical, environmental, and safety specifications of the heaps, as well as recommendations contained in the Ministry of Public Works' 2004 Environmental Management Plan Manual for Works Subject to Concessions. In particular, the Plan establishes the environmental considerations adopted for the operation of the muck disposal heaps, to be implemented during the construction of tunnels and roads under the PHAM.

In order to comply with the environmental management measures contained in the EIS, an Environmental Monitoring Program will be conducted, with the aim of verifying the effectiveness of these measures and compliance with them. For details on the principal actions included in the Monitoring Program, and for the various stages of functionality of the muck disposal sites, see **Annex 6 of the EIS** and **Annex 3 of Addendum 1**.

For more information on the specific regulations applicable to the Project, and compliance therewith, see **Chapter 3 of the EIS**.

MAR.02 Location

The PHAM calls for the creation of 14 muck disposal heaps, for the disposal of waste material from tunnel boring and smaller quantities of inert waste from the construction of roads and buried conduits. Maps of the muck disposal heaps, and a copy of the muck disposal heap management plan, are included in Annex 6 of the Project EIS.

For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria.

From a technical and safety perspective, the muck disposal heap sites have been located as close as possible to exit points from tunnels and to surface work sites, in areas not at risk to landslides or landslip events.

The following aspects have been taken into account as environmental criteria in site selection:

Sites have been selected that are distant from any settlements or any housing used on a permanent or temporary basis.

Priority has been given to selecting sites with low visual impact - that is, in areas that are distant from potential observation points on public highways or high ground.

In the Project area's higher elevation regions, the disposal heaps have been sited up against natural topological features, such that the emplacement of the heaps' layers forms a continuation of the general landform structures of the area.

In general these are areas that are of low value as a habitat for plant life (soils with usage capacity ratings V, VI, and VII), and efforts have been made to avoid modifications to the original land form structures present or to surface watercourses.

Surface surveys have been conducted in all of these regions, as details in **Section 5.8, in Chapter 5 of the EIS**, to rule out the presence of sites of archeological and/or paleontological value at the muck disposal heap sites.

For more information, see **Annex 6 of the EIS** and **Annex 3 of Addendum 1**.

Remark N° 172

2. Plan for Compliance with Applicable Environmental Legislation Environmental Regulations Legal Framework

According to Table 6 of the EIS

Table 6: Summary of Plan for Compliance with Applicable Environmental Legislation

Law 17,288

(Law 20,021)

Supreme

Decree 484

Cultural Heritage: The Project shall not affect the sites identified in the Baseline studies.

Nonetheless, as a protection measures the Project Owner shall contractually require that the works contractor implement the measures to prevent risks to archeological and paleontological heritage

- **The Chilean Paleontological Society (SPACH) states that a risk of impact on paleontological heritage sites exists.**

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

AGU.01 Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum 1**.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material
- b) creation of a viewpoint
- c) fossil trail

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

ARQ.03 Scientific research

the scientific and cultural importance of the paleontological resources present has been recognized by the PHAM Project Owner,

leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the Project Owner has taken on a commitment to enhance knowledge of the area before starting planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may be detected during the course of construction under the PHAM. These activities will contribute not only to the maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of materials or components present.

For more information, see **Annex 14** of **Addendum 1**.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

Remark N° 173

Baseline

V.6 Cultural Heritage

According to the text of the EIS

“Three areas within the Project’s area of direct influence are identified as featuring resources of cultural interest: Las Morrenas and Camino del Inka in the Lo Encañado Lake area, and the site known as Aucayes 1 in the Colorado River - Aucayes Stream area. The “Las Morrenas” site is currently in a good state of conservation, the “Camino del Inka” site exhibits significant impact arising as a result of the construction of a water conduit that is currently not in use, and meanwhile the Aucayes 1 exhibits no apparent human or natural impact. In the Alto Volcán area, sites have been detected that may contain very ancient fossils or paleontological material.. Much of this material has been removed by tourists and residents of local settlements (according to background information available to the SPACH) Works under the PHAM shall not lead to any direct intervention”.

- **The Chilean Paleontological Society states that no reference has been made to the issue of tourists and local residents in relation to paleontological heritage, in communications with the company AES Gener. Additionally, we wish to make it clear that works under the PHAM do lead to intervention affecting fossil evidence.**

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project’s area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project’s area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

ARQ.02 Values preservation

General paleontological protection measures:

i) **Restricted area applicable to contractor company employees**

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a “restricted zone” with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) **Delimitation of buffer zones**

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) **Contingency measures**

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project’s paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) **Compensation measures**

- a) **production of cultural information material**
- b) **creation of a viewpoint**
- c) **fossil trail**

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District’s high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plant (**EIS, Chapter 8**); together, these measures

are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **TUR Tourism Scenery**

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 174**5. Identification, Prediction, and Evaluation of Environmental Impacts and Risk Situations****Environmental Evaluation**

According to the table in the EIS

I. Table 7: Hierarchy of Environmental Impacts

Construction phase

Elements or variables:

Cultural Heritage

Impact:

Three areas with resources of archaeological interest and one area of paleontological interest have been identified within the Project's area of indirect influence. Continual on-site expert advisory services will be contracted to prevent or minimize impact

Classification

Negative; Low significance

- **SPACH remark. According to information available, the sites of paleontological interest will be located within the project's area of direct influence. To which site is reference made with regard to the area of indirect influence?**

Thematic responses**ARQ Archeological and Paleontological Sites: Heritage**

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

ARQ.01 Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
 - Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
 - Archeological recovery plan for any finds discovered during expert supervision.
 - Workforce training on the possible presence of archeological sites.
 - Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum**.
- 1.

Remark N° 175

Chapter 2. Project Description

2.3 Description of Project Phases

2.3.2 Construction Phase

2.3.2.4 Creation of Encampments and Works Installations

According to the text of the EIS

A. Siting criteria

"Finally, and in accordance with the baseline study, the sites defined for the installation of site facilities and encampments have been surveyed by specialists, and the results of these surveys have, on a preliminary basis, ruled out the presence of findings and sites with archaeological or historic value, or belonging to national cultural heritage, or plant species listed in any conservation category "

- **SPACH remark. According to paleontological information available, sites with heritage value exist in the areas defined for the installation of site facilities and encampments.**

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

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1.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material
- b) creation of a viewpoint
- c) fossil trail

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned

to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

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The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

PRO.03.03 Encampments and Works Installations

For details on the creation of encampments and works installations, please see Chapter 2, Section 2.3.2.4 in the EIS.

For information on PHAM encampment and work site approach routes, see EIS, Chapter 2, Table 2.1.2,

For information on regulations, see Chapter 3 of the EIS and Annex 33, General Operating Regulations for Encampments and Work Sites.

For information on the management of waste produced at work sites and encampments, see Annex 18 of the EIS, "Site Installation Waste Management Plan".

For information on the discharge of treated wastewater, see Response 26 in the Addendum. For information on human consumption of water at encampments and works installations, see Chapter 2, Section 2.3.2.4, parts b and i.

For an assessments of the impact of the creation of encampments and works installations, monitoring methods, and conditions, see Chapter 6 of the EIS.

Remark N° 176

2.3.2.6 Muck Disposal Heap Sites

According to the text of the EIS

A. Siting

"The following aspects have been taken into account as environmental criteria in site selection:

- Surface surveys have been conducted in all of these regions to rule out the presence of sites of archeological and/or paleontological value"

- **SPACH remark. According to information available, sites with paleontological value exist in the areas defined for the Alto Volcán muck disposal heap.**

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

MAR Muck

The PHAM plans to construct approximately 70 km of tunnels. The excavation of these tunnels will generate inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of inert material produced in road building and the construction of buried conduits.

This muck material will be deposited in the 14 muck disposal heaps that the Project plans to create. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria. For more information, please see **Annex 6 of the EIS** and **Annex 3 of the Addendum**.

MAR.02 Location

The PHAM calls for the creation of 14 muck disposal heaps, for the disposal of waste material from tunnel boring and smaller quantities of inert waste from the construction of roads and buried conduits. Maps of the muck disposal heaps, and a copy of the muck disposal heap management plan, are included in Annex 6 of the Project EIS. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria.

From a technical and safety perspective, the muck disposal heap sites have been located as close as possible to exit points from tunnels and to surface work sites, in areas not at risk to landslides or landslip events.

The following aspects have been taken into account as environmental criteria in site selection: Sites have been selected that are distant from any settlements or any housing used on a permanent or temporary basis.

Priority has been given to selecting sites with low visual impact - that is, in areas that are distant from potential observation points on public highways or high ground.

In the Project area's higher elevation regions, the disposal heaps have been sited up against natural topological features, such that the emplacement of the heaps' layers forms a continuation of the general landform structures of the area.

In general these are areas that are of low value as a habitat for plant life (soils with usage capacity ratings V, VI, and VII), and efforts have been made to avoid modifications to the original land form structures present or to surface watercourses.

Surface surveys have been conducted in all of these regions, as details in **Section 5.8, in Chapter 5 of the EIS**, to rule out the presence of sites of archeological and/or paleontological value at the muck disposal heap sites.

For more information, see **Annex 6 of the EIS** and **Annex 3 of Addendum 1**.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly

frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water

abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El

Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

Remark N° 177

Chapter 4. Relevance of the Environmental Impact Evaluation System (SEIA) and

Need to Conduct an Environmental Impact Study.

4.3 Analysis of Articles 5 to 11 of the SEIA Regulations.

4.3.6 Article 11

- SPACH remark.

Cases a) and b) show proximity, and furthermore, sites corresponding to paleontological heritage exist that shall be subject to direct intervention. In the Alto Volcán area, the Lo Valdés Formation will be affected by the construction of the El Volcán Tunnel, which passes through and destroys the formation. The same area features ichnites (fossilized vertebrate tracks) in blocks, belonging to the Rio Damas Formation, particularly in the Valle de las Arenas.

The SPACH has reported the presence of these sites, and has been vocal in communication with the Project Owner AES Gener in its assertions that the PHAM will cause direct intervention on paleontological heritage, which will be affected by surface and underground works, or works requiring excavation.

The SPACH expresses its concern, given that it is not in agreement with the conclusion reached by AES Gener in this regard, as paleontological heritage will be subject to significant intervention under the PHAM.

Thematic responses

ARQ Archeological and Paleontological Heritage Sites:

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

ARQ.01 Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum 1**.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material
- b) creation of a viewpoint

c) fossil trail

For more information and details on the preservation of heritage value and

paleontological resources, please see **Annex 14 of Addendum 1**.

OTR Other

This section relates to certain special situations that could not be categorized, or that are linked to specific requests, disqualifications, or situations that feature a clear political component, against either the environmental authority or the Project Owner.

PRO.02 EIS Additional and Complementary Information

In accordance with consultation procedures conducted by oversight services, further studies and information have been incorporated into Addendum 1, which complements existing information provided in the EIS. Regarding ecological flow rates (**Annex 17**), cultural heritage (**Annex 14**) and the management of summer grazing areas (**Annex 6**).

PRO.03 Works

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PRO.03.02 Tunnels

The majority of the Project is planned for installation underground. The general characteristics of the tunnels are described in Chapter 2 of the EIS, Table 2.2.5 (for detailed geological information on the path taken by the tunnels, see Annex 46 of the EIS).

For an evaluation of the impact and environmental management measures associated with underground installations, see Chapter 6 of the EIS.

Annex 45 of the EIS, Hydro-Geology of Underground Works, presents a general description of the geological conditions that are expected to be found along the lengths of the tunnels; expected permeability based on geological knowledge and hydro-geological conditions in the area, incorporating experience gained during the construction of tunnels for the Alfalfal Plant, which has been operative for more than 17 years; as well as a description that includes the design of the tunnels, providing a brief explanation of the methods to be used to reduce and control water seepage.

With regard to the impact of the path taken by the tunnel passing underneath the El Morado Natural Monument, and measures to be taken to respect the area, see Section I, Responses 4, 5, and 6, in the Addendum.

Remark N° 178
Chapter V. Baseline
5.6 Existing Buildings
5.6.2 Economic and Production Activities
5.6.2.4 Tourism Sector
D. El Volcán, Baños Morales, and Lo Valdés
area. I. Current Tourism Activities
Rock hunting and archeological research

- SPACH remark. This point mentions the sale of fossils as an activity related to tourism, although this activity is illegal.

Thematic responses

**ARQ Archeological and
Paleontological Sites: Heritage**

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

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ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

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Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material
- b) creation of a viewpoint
- c) fossil trail

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual

conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **TUR Tourism Scenery**

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-

related traffic flow during

weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 179

5.8 Cultural Heritage, Paleontological Resources; Background Information on the Study Area

The Chilean Paleontological Society addressed letters to the CMN, Cordillera Provincial Government, CONAMA, Municipal Government of San José de Maipo, and AES Gener, expressing its concern regarding damage that will be caused to paleontological heritage in the Alto Volcán area, stating

that damage will be caused to geological units such as the Lo Valdés, Colimapu, and Rio Damas formations, which have shown evidence of fossils. Attached to these letters, it included the **“Preliminary Report on Material of Paleontological Interest in the Alto Río Volcán Area”**, prepared by Dr. Karen Moreno, regarding the ichnites (fossilized vertebrate tracks) in blocks, belonging to the Rio Damas Formation, located in the Valle de las Arenas.

In view of existing knowledge regarding the area to be subject to intervention under the PHAM, the SPACH indicates that direct intervention affecting paleontological heritage will indeed occur.

5.8.5 Conclusions

SPACH expresses the conclusion that it is not in agreement with the presence of paleontological resources, as direct intervention affecting these resources clearly does exist. It is necessary to conduct a paleontological survey, research activities, and subsequent monitoring of waste rock if the PHAM goes ahead, which activities should be conducted by qualified professionals.

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project’s area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project’s area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
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For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a “restricted zone” with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project’s paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material
- b) creation of a viewpoint
- c) fossil trail

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

ARQ.03 Scientific research

The scientific and cultural importance of the paleontological resources present has been recognized by the PHAM Project Owner, leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the Project Owner has taken on a commitment to enhance knowledge of the area before starting planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may be detected during the course of construction under the PHAM. These activities will contribute not only to the maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country’s non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects

of this project, particularly where justified by the heritage significance of materials or components present.
For more information, see **Annex 14** of **Addendum 1**.

Remark N° 180

Chapter 6. Impact Evaluation and Environmental Management Measures

6.4 Impact Evaluation and Environmental Management Measures

6.4.1 Construction Phase

6.4.1.9 Interference with Tourism Activities

I) Identification and Sources of Impact

- Alto Volcán Sector

- SPACH remark. Contrary to statements made by AES Gener in its EIS, at this point it is indeed our belief that sites of paleontological cultural interest will be affected.

Thematic responses

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Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

PRO.03.01 Intakes

The Alto Maipo Hydroelectric Project (PHAM) plans to capture water resources at eight different points. The Project holds in-stream water rights at each of these points, and the concessions granting rights at most of these points include ecological flow rate stipulations issued by the Directorate General of Water (DGA).

The water intake points are as follows:

For the Alfalfal II Plant: the El Morado Stream, the La Engorda Stream, the Colina Stream, the Las Placas Creek, and the Yeso River. For the Las Lajas Plant: the Alfalfal Plant discharge, and the Colorado River at the Maitenes Intake. For a detailed description of planned installations, see Chapter 2, Section 2.2.2 of the EIS, and attached Annexes 1 and 8.

See Annex 12 of the EIS for a map of intakes in the PHAM area of influence. See Table 2.2.2, in Chapter 2 of the EIS, for the characteristics and descriptions of the intake installation.

For information on the Project's impact on water quality in the area's watercourses arising as a result of the construction of intakes, see Section I, Question 3 in the Addendum.

For the intake maintenance plan, the Chapter 2, Section 2.2.2 of the EIS, and additional information provided in Section I, Question 11 of the Addendum.

For clarifications regarding the El Yeso Reservoir, see Section I, question 27 in the Addendum.

For details on the construction methods and the mitigation and compensation measures planned by the Project to address the environmental impact of the intakes, see Annex 6 of the Addendum.

PRO.03.02 Tunnels

The majority of the Project is planned for installation underground. The general characteristics of the tunnels are described in Chapter 2 of the EIS, Table 2.2.5 (for detailed geological information on the path taken by the tunnels, see Annex 46 of the EIS).

For an evaluation of the impact and environmental management measures associated with underground installations, see Chapter 6 of the EIS.

Annex 45 of the EIS, Hydro-Geology of Underground Works, presents a general description of the geological conditions that are expected to be found along the lengths of the tunnels; expected permeability based on geological knowledge and hydro-geological conditions in the area, incorporating experience gained during the construction of tunnels for the Alfalfal Plant, which has been operative for more than 17 years; as well as a description that includes the design of the tunnels, providing a brief explanation of the methods to be used to reduce and control water seepage.

With regard to the impact of the path taken by the tunnel passing underneath the El Morado Natural Monument, and measures to be taken to respect the area, see Section I, Responses 4, 5, and 6, in the Addendum.

Remark N° 181
Chapter 7. Environmental
Management Plan
7.2 Environmental Risk Control and Prevention Plan.
7.2.1 Identification of Environmental Risks
7.2.1.2 Description of Risks Generated by
Human Intervention
iv) Risk of Accidental Interference with Items of Cultural
Value

According to the text of the EIS

"Additionally, the Project Owner recognizes the existence of paleontological sites in the Alto Volcán area, and that although these sites are located close to the area where certain surface construction activities are to be conducted, they will not be affected. This issue was rectified at a meeting between the Project Owner and the Chilean Paleontological Society".

The Chilean Paleontological Society refutes the statements made by the Project Owner in the text quoted above, and indicates that at a meeting held with AES Gener on January 3, 2008, it made clear to that company's representatives that, according to background information available, the Project would affect sites of paleontological interest, whether works were conducted on the surface or underground (El Volcán Tunnel). Specifically, surface works were planned for implementation in sites of paleontological interest. Additionally, the damage to be caused to paleontological sites by the El Volcán Tunnel would be a pressing concern, referring to the Lo Valdés Formation, through which the tunnel would pass.

Thematic responses

ARQ Archeological and Paleontological Heritage Sites:

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

AGU.01 Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum**.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) **production of cultural information material**
- b) **creation of a viewpoint**
- c) **fossil trail**

For more information and details on the preservation of heritage value and

paleontological resources, please see **Annex 14 of Addendum 1**.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

PRO.03.01 Intakes

The Alto Maipo Hydroelectric Project (PHAM) plans to capture water resources at eight different points. The Project holds in-stream water rights at each of these points, and the concessions granting rights at most of these points include ecological flow rate stipulations issued by the Directorate General of Water (DGA).

The water intake points are as follows:

For the Alfalfal II Plant: the El Morado Stream, the La Engorda Stream, the Colina Stream, the Las Placas Creek, and the Yeso River. For the Las Lajas Plant: the Alfalfal Plant discharge, and the Colorado River at the Maitenes Intake. For a detailed description of planned installations, see Chapter 2, Section 2.2.2 of the EIS, and attached Annexes 1 and 8.

See Annex 12 of the EIS for a map of intakes in the PHAM area of influence. See Table 2.2.2, in Chapter 2 of the EIS, for the characteristics and descriptions of the intake installation.

For information on the Project's impact on water quality in the area's watercourses arising as a result of the construction of intakes, see Section I, Question 3 in the Addendum.

For the intake maintenance plan, the Chapter 2, Section 2.2.2 of the EIS, and additional information provided in Section I, Question 11 of the Addendum.

For clarifications regarding the El Yeso Reservoir, see Section I, question 27 in the Addendum.

For details on the construction methods and the mitigation and compensation measures planned by the Project to address the environmental impact of the intakes, see Annex 6 of the Addendum.

PRO.03.02 Tunnels

The majority of the Project is planned for installation underground. The general characteristics of the tunnels are described in Chapter 2 of the EIS, Table 2.2.5 (for detailed geological information on the path taken by the tunnels, see Annex 46 of the EIS).

For an evaluation of the impact and environmental management measures associated with underground installations, see Chapter 6 of the EIS.

Annex 45 of the EIS, Hydro-Geology of Underground Works, presents a general description of the geological conditions that are expected to be found along the lengths of the tunnels; expected permeability based on geological knowledge and hydro-geological conditions in the area, incorporating experience gained during the construction of tunnels for the Alfalfal Plant, which has been operative for more than 17 years; as well as a description that includes the design of the tunnels, providing a brief explanation of the methods to be used to reduce and control water seepage.

With regard to the impact of the path taken by the tunnel passing underneath the El Morado Natural Monument, and measures to be taken to respect the area, see Section I, Responses 4, 5, and 6, in the Addendum.

PRO.03.03 Encampments and Works Installations

For details on the creation of encampments and works installations, please see Chapter 2, Section 2.3.2.4 in the EIS.

For information on PHAM encampment and work site approach routes, see EIS, Chapter 2, Table 2.1.2,

For information on regulations, see Chapter 3 of the EIS and Annex 33, General Operating Regulations for Encampments and Work Sites.

For information on the management of waste produced at work sites and encampments, see Annex 18 of the EIS, "Site Installation Waste Management Plan".

For information on the discharge of treated wastewater, see Response 26 in the Addendum. For information on human consumption of water at encampments and works installations, see Chapter 2, Section 2.3.2.4, parts b and i.

For an assessments of the impact of the creation of encampments and works installations, monitoring methods, and conditions, see Chapter 6 of the EIS.

Remark N° 182
7.2.6 Specific Risk Control Measures in Areas with Paleontological Resources (Valle del Arenas)

- SPACH remark. Paleontological resources may be affected by the implementation of surface and underground works.

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

AGU.01 Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
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General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

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In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material
- b) creation of a viewpoint
- c) fossil trail

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect

caused by the annoyances that are typical of construction works. Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

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For information on the Project's impact on water quality in the area's watercourses arising as a result of the construction of intakes, see Section I, Question 3 in the Addendum.

For the intake maintenance plan, the Chapter 2, Section 2.2.2 of the EIS, and additional information provided in Section I, Question 11 of the Addendum.

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PRO.03.02 Tunnels

The majority of the Project is planned for installation underground. The general characteristics of the tunnels are described in Chapter 2 of the EIS, Table 2.2.5 (for detailed geological information on the path taken by the tunnels, see Annex 46 of the EIS).

For an evaluation of the impact and environmental management measures associated with underground installations, see Chapter 6 of the EIS.

Annex 45 of the EIS, Hydro-Geology of Underground Works, presents a general description of the geological conditions that are expected to be found along the lengths of the tunnels; expected permeability based on geological knowledge and hydro-geological conditions in the area, incorporating experience gained during the construction of tunnels for the Alfalfal Plant, which has been operative for more than 17 years; as well as a description that includes the design of the tunnels, providing a brief explanation of the methods to be used to reduce and control water seepage.

With regard to the impact of the path taken by the tunnel passing underneath the El Morado Natural Monument, and measures to be taken to respect the area, see Section I, Responses 4, 5, and 6, in the Addendum.

PRO.03.03 Encampments and Works Installations

For details on the creation of encampments and works installations, please see Chapter 2, Section 2.3.2.4 in the EIS.

For information on PHAM encampment and work site approach routes, see EIS, Chapter 2, Table 2.1.2,

For information on regulations, see Chapter 3 of the EIS and Annex 33, General Operating Regulations for Encampments and Work Sites.

For information on the management of waste produced at work sites and encampments, see Annex 18 of the EIS, "Site Installation Waste Management Plan".

For information on the discharge of treated wastewater, see Response 26 in the Addendum. For information on human consumption of water at encampments and works installations, see Chapter 2, Section 2.3.2.4, parts b and i.

For an assessments of the impact of the creation of encampments and works installations, monitoring methods, and conditions, see Chapter 6 of the EIS.

Remark N° 183 Global Issue

I believe that if this Project is not rejected then it will affect us, due to its impact on the landscape, biodiversity, the river basin equilibrium, the filling of aquifers, air quality, and quality of life.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS**.

This section presents information characterizing the basins and tributaries of the Volcán, Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex

13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS**.

AGU.03.03 Underground water

Underground water will not be affected in any way by the operation of the Project. This is the case because the underground water flow capacity in each sector of the aquifer associated with the Maipo River is much lower than the minimum flow running through each section of the river, and therefore under all circumstances the aquifers shall remain saturated. Thus, underground water sources present in the area shall also not be affected. The PHAM plans to construct 70 km of tunnels, of which approximately 50 km correspond to headworks or hydraulic pressure tunnels, the remainder being access tunnels for use during construction of the project and for subsequent operation of the power plants (see **EIS Chapter 5, Section 5.3.5.3**).

Most of these tunnels have been designed to operate at variable internal pressures, with a maximum achieved at certain points of a little more than 450 m. The design requirement for these tunnels is that the lower limit of principal compression in the surrounding rock medium is always less than the operating pressure, such as to maintain a sufficient safety margin to prevent alterations in natural permeability dynamics through hidrojacking. In areas where this design principle is not guaranteed, the Project plans to install impermeable tunnel linings (**EIS, Annex 45.4**).

During the excavation of these tunnels, it is possible that the work front may have to pass through permeable rock strata - leading to seepages of water into the tunnel, the magnitude of which will depend on the permeability of the rock, the depth of the tunnel, and the level of the water table. In some areas, tunnel wall treatments may have to be applied in order to prevent water transfer into or out of the headworks tunnels.

The Project does not plan to make use of any water seepages that may arise, in the generation of electricity. Additionally, the overarching design principles underpinning the Project are oriented towards limiting seepages during construction, in order to establish suitable conditions for efficient

tunnel excavation activities. The same principle applies to methods to limit the infiltration of water from the tunnels into the rock mass, thus avoiding water loss during operations.

Additionally, these procedures guarantee that any groundwater that may intercept the tunnels shall suffer no change in its natural hydrological dynamics, or impact on any foreign components or water other than the water entering the system (**EIS, Annex 45**). Special attention will be paid to the quality and characteristics of any water that may eventually return to the natural water system through the tunnel access windows, and therefore construction contracts will specify measurements that must be made and the treatment that shall be required for subsequent disposal of such water, in order to ensure compliance with the quality requirements for water discharge into natural watercourses, under regulations currently in force.

In the event of seepages of water at high temperature and possible acidic composition, it is important to make clear that in general there shall be no major differences in the methods used to render the tunnel walls impermeable. During all site surveys conducted, research boreholes and surface geological maps produced to date applying to the areas through which the tunnels will pass, no evidence whatsoever has been found to lead to any prediction of the presence of water at high temperatures, or with mineral or acidic contamination. As additional background information, during the construction of the Alfalfa Plant - with the excavation of 35 km of tunnels - no events similar to those indicated above occurred. Notwithstanding the above, the specification establish that, in locations located close to potentially critical areas, the contractor must drill survey

boreholes of between 25 m and 30 m in length ahead of the tunnel work front, in order to gain early warning of seepage problems and thus be able to apply impermeable tunnel wall treatments as required. See **EIS, Annex**

45.4.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

SLD.02 Atmospheric

Although the Project involves surface construction activities, which will lead to the emission of particulate matter, plans call for the implementation of a suite of mitigation measures that will result in a considerable reduction in emission, not only of the PHAM itself but also as against the baseline of current particulate emissions through the Project's area of influence. In addition to the above, these considerations should be evaluated bearing in mind the fact that most of the Project's works will be underground, not producing any emissions of particulate matter. Conversely, given that most of the Project's works are to be located in high mountain areas, it can be stated that the prevailing ventilation conditions in this environment will facilitate the dispersion of dust, with a natural reduction in emissions during the winter season as a result of the additional moisture contributed by rain and snow precipitation.

For more information on emissions compensation measures, see **Annex**

5 of the EIS.

SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

Remark N° 184 Inconsistencies

The ecological flow rates calculated by the company are not sufficient to preserve aquatic and riverbank life. They do not comply with the quantitative requirements that define the concept of an ecological flow rate. They feature inconsistencies, with the extraction of quantities of water larger than those possible during certain periods. The PHAM states that only 12% of river water flow will be abstracted; this figure was checked and found not to be the case for the Maipo River (50%).

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

F&F Biodiversity Impact

Flora and
Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of

environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.01 Regulations

The Project Owner shall comply with all legal environmental and sector-based regulations and requirements in force and applicable to the Project during the different phases of its development. The Project Owner has guaranteed compliance with the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and compliance with sector environmental permits.

Environmental regulations that apply to the Project have been identified based on its activities' potential environmental impacts affecting flora and fauna. The full extent of these regulations is included in **Chapters 3 and 4 of the EIS, and in Section 2, Question 1 in Addendum 1**.

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neopteris curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Lilolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend

to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

PRO.02 EIS Additional and Complementary Information

In accordance with consultation procedures conducted by oversight services, further studies and information have been incorporated into Addendum 1, which complements existing information provided in the EIS. Regarding ecological flow rates (**Annex 17**), cultural heritage (**Annex 14**) and the management of summer grazing areas (**Annex 6**).

Remark N° 185 River Basin Equilibrium

The equilibrium state of an ecosystem depends on the interaction of its components, and therefore a decline in moisture levels is not compatible with the preservation of the area's plant life, wildlife (habitat for a number of bird species, insects, and the Elegant Fat-tailed Mouse Opossum (*Thylamys elegans*)), or to prevent ice melt. Is the preservation of the equilibrium state guaranteed? What consideration is given to the Ministry of Mining Supreme Decree 78/06 (area of scientific mining interest)? What consideration is given to the Santiago Metropolitan Master Plan (Upper Maipo River Basin: key area of ecological preservation for the protection of high altitude wetland and stream micro-habitats)? What consideration is given to the Santiago Metropolitan Region Biodiversity Conservation Strategy (COREMA Metropolitana)?

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic

autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the

basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.01 Regulations

The Project Owner shall comply with all legal environmental and sector-based regulations and requirements in force and applicable to the Project during the different phases of its development. The Project Owner has guaranteed compliance with the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and compliance with sector environmental permits.

Environmental regulations that apply to the Project have been identified based on its activities' potential environmental impacts affecting flora and fauna. The full extent of these regulations is included in **Chapters 3 and 4 of the EIS, and in Section 2, Question 1 in Addendum 1**.

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neoporteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Liolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project

Owner, see Annex 4 of the Addendum.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1)

Chapter 3 of the EIS provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

Remark N° 186 Landscape

Preserving the visual quality of the landscape is one of our priorities, as this feature is not only of significant value to residents, those who work in the area or who spend their weekends relaxing there; it is also one of the country's most heavily visited tourism areas (SERNATUR). In this remark, we include the preservation of visual contact with all features that make up the landscape (water, plants, wildlife, valleys, glaciers) at a level effectively identical to the present situation. What will happen regarding this issue? Is it guaranteed? How will muck disposal avoid affecting this issue?

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term

mutually beneficial relationships between the project and its surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

**CAL.04 Fostering tourism
in the area**

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **MAR Muck**

The PHAM plans to construct approximately 70 km of tunnels. The excavation of these tunnels will generate inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of inert material produced in road building and the construction of buried conduits.

This muck material will be deposited in the 14 muck disposal heaps that the Project plans to create. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria. For more information, please see **Annex 6 of the EIS** and **Annex 3 of the Addendum**.

MAR.01 Regulations

The Project Owner has made available a Management Plan for "Project Muck Disposal Heaps", which contains information on the technical, environmental, and safety specifications of the heaps, as well as recommendations

contained in the Ministry of Public Works' 2004 Environmental Management Plan Manual for Works Subject to Concessions. In particular, the Plan establishes the environmental considerations adopted for the operation of the muck disposal heaps, to be implemented during the construction of tunnels and roads under the PHAM.

In order to comply with the environmental management measures contained in the EIS, an Environmental Monitoring Program will be conducted, with the aim of verifying the effectiveness of these measures and compliance with them. For details on the principal actions included in the Monitoring Program, and for the various stages of functionality of the muck disposal sites, see **Annex 6 of the EIS** and **Annex 3 of Addendum 1**.

For more information on the specific regulations applicable to the Project, and compliance therewith, see **Chapter 3 of the EIS**.

MAR.02 Location

The PHAM calls for the creation of 14 muck disposal heaps, for the disposal of waste material from tunnel boring and smaller quantities of inert waste from the construction of roads and buried conduits. Maps of the muck disposal heaps, and a copy of the muck disposal heap management plan, are included in Annex 6 of the Project EIS. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria.

From a technical and safety perspective, the muck disposal heap sites have been located as close as possible to exit points from tunnels and to surface work sites, in areas not at risk to landslides or landslip events.

The following aspects have been taken into account as environmental criteria in site selection: Sites have been selected that are distant from any settlements or any housing used on a permanent or temporary basis.

Priority has been given to selecting sites with low visual impact - that is, in areas that are distant from potential observation points on public highways or high ground.

In the Project area's higher elevation regions, the disposal heaps have been sited up against natural topological features, such that the emplacement of the heaps' layers forms a continuation of the general landform structures of the area.

In general these are areas that are of low value as a habitat for plant life (soils with usage capacity ratings V, VI, and VII), and efforts have been made to avoid modifications to the original land form structures present or to surface watercourses.

Surface surveys have been conducted in all of these regions, as details in **Section 5.8, in Chapter 5 of the EIS**, to rule out the presence of sites of archeological and/or paleontological value at the muck disposal heap sites.

For more information, see **Annex 6 of the EIS** and **Annex 3 of Addendum 1**.

**TUR Tourism
Scenery**

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is

expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.
Given that most works are to be located underground and in high mountain areas,

a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

TUR.03 Visual impact

The Project is to be located, taking into account esthetic and perceptual considerations and emphasizing the characterization and appraisal of the issues of visibility, quality, and visual fragility of the landscape.

In terms of Landscape Alteration or Landscape Impact associated with this infrastructure project, potential effects are classified as either limited duration - generally applying during the construction phase - or permanent, for effects that shall persist during the operations phase and continue throughout the working life of the Project. A qualitative methodology

is used to study these effects, whereby the first phase consists of identifying sources of visual impact, and the second phase relates to identifying and classifying environmental impacts.

As a general rule, it is assumed that impact on the landscape during the construction phase shall be temporary, mainly due to the transitory nature of the sources of impact, the low level of prior human activity in certain areas, and the relatively low level of physical and visual accessibility of a significant proportion of the area subject to intervention.

As most of the Project construction works will be situated underground, during the operations phase the main visual signatures of its existence will be the intakes and access roads. For further information on the methodology used for landscape impact assessment, see **Chapter 6, Section 6.1.4.10 of the EIS, and Annex 17 of**

Addendum 1.

Remark N° 187 Quality of Life

What will happen with truck traffic? We want an environment free of traffic congestions, air pollution, and visual and noise pollution. How will this issue be guaranteed?

Thematic responses

SLD Health Impact

The Project owner shall take responsibility for ensuring compliance with health and safety regulations, in order to prevent any possible risk to health and physical integrity for the inhabitants of San José Maipo as well as the persons working on the Project.

SLD.01 Regulations

The Project Owner is subject to specific environmental regulations that apply to the Project, determined based on environmental impacts associated with noise and air pollution during works construction and other activities. For further details, see **Chapters 3.2.2 and 3.2.1 in the EIS**. The Project Owner shall take responsibility for compliance with the monitoring plan.

SLD.02 Atmospheric

Although the Project involves surface construction activities, which will lead to the emission of particulate matter, plans call for the implementation of a suite of mitigation measures that will result in a considerable reduction in emission, not only of the PHAM itself but also as against the baseline of current particulate emissions through the Project's area of influence. In addition to the above, these considerations should be evaluated bearing in mind the fact that most of the Project's works will be underground, not producing any emissions of particulate matter. Conversely, given that most of the Project's works are to be located in high mountain areas, it can be stated that the prevailing ventilation conditions in this environment will facilitate the dispersion of dust, with a natural reduction in emissions during the winter season as a result of the additional moisture contributed by rain and snow precipitation.

For more information on emissions compensation measures, see **Annex 5 of the EIS**.

SLD.03 Acoustic

In the field of Environmental Impact, specifically acoustic impact, the Project Owner has conducted a wide-ranging study to estimate acoustic emissions generated during the construction of the PHAM. For more information on the acoustic impact of the PHAM, and methodologies, modeling techniques, and actions to be taken to minimize such impact, please see **Annex 30 of the EIS** and **Section II, Question 8 in the Addendum**.

Plans for blasting activities, specifically including the frequency, quantity, timing, and work periods of blasting, will be determined on site in accordance with the characteristics of each works activity and work site. Regarding works activity scheduling, priority will be placed on completion of surface works during the daytime (8:00-21:00 hrs.); for blasting activities, plans call for an information program at the time of the activity, defining and clarifying the periods when noise-producing activities will take place, in order to integrate the community into efforts towards the completion of the Project.

Another point worthy of emphasis is that the work sites (tunnel excavation, access windows, and entrances/exits) will not be sited close to settlements, thus preventing most of the potential acoustic impact that could be caused by the PHAM.

Wildlife rescue will be conducted through animal rescue activities based on the trapping of reptiles and amphibians before explosives are used, before service tracks are built, and before the modification of river flow.

Finally, and in order to comply with the requirements set forth above, the Project Owner shall be subject to:

1. Supreme Decree 146 (Establishing Standards on the Emission of Nuisance Noise Generated by Fixed Sources) establishing maximum permissible sound pressure levels, corrected according to technical criteria to evaluate and classify nuisance noises generated by fixed sources affecting the community, such as industrial, commercial, leisure, and artistic activities.
2. Exempt Decree 130 (Establishing restrictions on the movement of cargo trucks). The movement of trucks larger than 4 tons will be suspended from 14:00 hours on Saturdays through to midnight on each Sunday night on Route G-25 and Route G-421.

For more information on the acoustic impact of the PHAM, and regulations (Chapter 6 of the EIS), mitigation measures, methodologies, modeling techniques, and actions to be taken to minimize such impact, please see Annex 30 of the EIS, as mentioned above.

Finally, in order to verify the effectiveness of the mitigation measures taken, noise monitoring will be conducted at 8 sensitive points, following the procedure established in MINSEGPRES Supreme Decree 146/97, in order to verify compliance with the maximum permitted limits for sound pressure level (see details in **Chapter 8 of the EIS, Section 8.2.2**).

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.03 Congestion

When PHAM Project construction activities begin, there will be an increase in road traffic movements in the immediate surroundings of the work area. This vehicle movement will be related mainly to the transport of supplies and machinery to the works installations, transport of excavation spoil to muck deposition sites, and, to a lesser extent, the transport of personnel to the work sites. For more information on traffic flow increases resulting from the Project, see **Chapter 2, section 2.4.1, part E, Annex 14 of the EIS, and Annexes 9 and 14 of Addendum 1**.

The PHAM highway impact analysis takes into account all works and activities under the Project, including the transport of supplies, machinery, and personnel. According to modeling studies, it is predicted that there will be no significant impact on highway usage (levels of saturation of new and existing roads and intersections). For more information on the Project's road operations, measurements used and models derived, see **Annexes 9 and 15 of the Addendum**. Additionally, increases in noise emissions are analyzed in **Section 6.4.1.2 of the EIS**.

Notwithstanding the above, it is assumed that, given that certain construction activities shall be conducted at the same times that other road users wish to make use of certain sections of specific roads, a certain level of annoyance may be caused, and for this reason the PHAM has adopted a number of control and mitigation measures, indicated in **Chapters 6 and 2 of the EIS** and in **Annex 14 of the EIS, as well as Annexes 9 and 17 of Addendum 1.**

It is considered likely that, in view of the predominance of the tourist industry in the local economy of the district of the Maipo Valley, a certain level of annoyance may be caused at certain points and at specific moments, mainly due to conflicts between PHAM road usage and the movements of visitors. As indicated in the EIS Baseline Study, this is an area where tourists come to enjoy walks and peace and quiet, on weekends and holidays. In particular, there are 2 specific tourism attractions located in the same areas as site installations: the El Yeso and the Alto Volcán area, where special measures shall be taken, as specified in **Chapter 6 of the Project EIS.** Additionally, **Annex 32 of the EIS** specifies emergency procedures to be adopted in the event of transport accidents caused by project vehicles.

Remark N° 188 Corporate Responsibility

What consideration will be given to the law that whoever pollutes pays for it? We want the Cajón del Maipo area to be able to conserve its present level of quality (Law 19,300). Who will take responsibility for the full magnitude of each impact? Will this be the company? Has this been demonstrated? How will effective enforcement be ensured? We are aware that this not one of the strengths of our country.

Grounding for Technical Information

Hydrological study conducted by hydraulic engineer Jack Stern. Official information provided by the DGA (database covering a period going back 70 years). Reports prepared by the Universidad de Chile, Universidad Católica, and Universidad Andrés Bello

Thematic responses

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly

frequented, minimizing their visual impact.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1)

Chapter 3 of the EIS provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

PRO.01.01 Compensation

The concept of compensation refers to the act of indemnifying damages or harm caused. Within the framework of the EIS, the Project Owner has issued a proposal to the competent authority regarding a suite of environmental management measures aiming to minimize, compensate, and restore the Project's impacts, making their implementation sustainable (Chapter 6 of the EIS).

In this regard, compensation is understood to be included in the spirit or end goal of the environmental management measures proposed by the Project Owner, following the evaluation of the direct and indirect effects of the PHAM on each of the environmental components stipulated in Supreme Decree 95, SEIA Regulations.

Remark N° 196 Drinking Water Supply System in the Settlement of El Manzano

This settlement is not included in the Aguas Andinas S.A. concession area, nor is it covered by any other drinking water supply company. Water is distributed to different properties through actions managed by the community's associations of property owners, which are non-profit institutions governed by Law 19418 and complementary statutes and regulations, taking responsibility for representation, construction, and maintenance of infrastructure to permit the equitable distribution of water resources obtained from Aguas Andinas, or any other inflow replacing this supply if and when it is not available.

The water that we are supplied is dependent on production, and governed by an agreement signed in 1988 between EMOS (now Aguas Andinas) and the community of El Manzano, which agrees the supply of

100 m³ per day, delivered at a large scale water meter maintained by the company among the water intakes that it possesses in the El Manzano Stream; this supply agreement is subject to total suspension for several days at a time, during any period of the year, when water exhibits turbidity, or in the event of emergencies or any other event seen by the company as good cause to suspend service.

The shortfall in drinking water is made up by making use of a proportion of the end user water rights held by members of the association of property owners and normally used for land irrigation, organized by the El Manzano Channel Water Community; this causes serious individual infrastructure costs, in order to permit this irrigation water to be decanted, collected, and chlorinated so that it can safely be used, without risks to families consuming it, and in accordance with universal practices recommended for similar cases.

To date, 324 land owners are members of the drinking water distribution system association, and 91 land owners have yet to join the system, in a land area of 292 hectares - all directly or indirectly supplying our homes with the 100 m³ of water supplied to us each day by Aguas Andinas, and using part of the end user water rights that we hold over water from the Colorado River. This quantity will rise by 885% during the next three five-year periods, due to the implementation of the District Master Plan, which authorizes a considerable expansion in our settlement's population - which will still be supplied with drinking water using the same system.

Thematic responses

Specific response

The Project Owner reiterates its commitment to ensuring that necessary infrastructure exists in the river to permit water to enter the channels at all times, in accordance with the rights granted and the availability of the river throughout the life of the PHAM project.

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see **Table 2.3.4** in **Chapter 2 of the EIS**.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena

Channel intake, located approximately 4.5 km upstream of the

Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 "Hanging" **channels**

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.04.02 **Maximum flow rates to be abstracted**

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 **Ecological flow rates**

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally

complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

AGU.05 Drinking water supply

Construction works and/or activities involved in the project (roads, movement of materials, transport of different products, etc) shall have no effect or impact whatsoever on the quality or security/safety of water supply in the Maipo River system. During the construction phase, Project interventions affecting watercourses shall cause only temporary effects resulting from Earth moving during excavation and other construction activities. This intervention shall affect small areas over short time periods, as it shall last only during the period while these installations are under construction (see **Section 6.4.1.4 of the EIS and Section VII, Question 17, in the Addendum**).

During operations, the PHAM shall not affect the Laguna Negra-Lo Encañado and El Yeso Reservoir system, which is managed by the company Aguas Andinas S.A, in its capacity as holder of the drinking water concession for Santiago; nor shall the Project affect the operational dynamics of the drinking water supply system. Therefore, the implementation of the PHAM does not imply any impact whatsoever on the supply of drinking water (see **Section I, responses 27 and 29, in the Addendum**).

Furthermore, the water abstracted by the Project shall be returned to the river 5 km upstream of the Toma Independiente or Independent Intake, operated by the company Aguas Andinas S.A., which abstracts water for drinking water supply to the city of Santiago; therefore, the PHAM shall not affect normal operations of this system. The PHAM shall only affect the delivery point of water in the tributaries of the Maipo River; in other words, water that currently does not drain into the Maipo River shall not be incorporated into that river's total flow.

However, in the event that an incident may arise as a result of an accident during construction, such as accidental spillages or rock falls, the procedures described in the Contingency Plan shall be implemented, consisting of a suite of actions to solve associated problems. This plan is explained in detail in **Chapter 7 of the EIS, Section 7.2.5**.

AGU.05.01 Drinking water quality

The process of hydroelectric power generation does not affect the physical/chemical qualities of water. Additionally, the PHAM does not plan to implement regulation installations that retain sediment. Thirdly, downstream of the discharge point the natural river conditions are maintained with regard to flow rate and physical/chemical properties.

During the construction of installations to be located in watercourses, the free-flowing course of the river is maintained through the construction of diversions through pipes laid along the river course for such purposes, or through channels that divert all flow, allowing free water circulation with no effect whatsoever on quality (see **Section I, Question 28, in the Addendum**).

The Project owner shall not make use of the Lo Encañado Lake or water usage rights owned by Aguas Andinas S.A. for this Project, instead opting to forgo usage of these resources and to replace the role that would have been fulfilled by the Lo Encañado Lake with a forebay located on a widening of the Alfalfal II plant headworks, located in the Alto Aucayes area on the Colorado River Valley (for details, see **EIS 2.2.1**). The Lo Encañado area shall be assigned a status of controlled access area at all times: it shall not be subject to any intervention whatsoever.

The Project Owner has made available a Water Quality Monitoring Program, with specifications for application during both the construction and operations phases. This program espouses a commitment to verify the effectiveness of environmental control measures designed to minimize the effects of works construction activities during the construction phase.

For further information on the Monitoring Program, see **Sections 8.2 and 8.3 in Chapter 8 of the EIS**.

Remark N° 197 Colorado River Sedimentation Study

No sedimentation study is included applying to the Colorado River. In view of the considerable drop in flow rate in this watercourse, and the discharge of the forebays and sand traps of the Alfalfal, Alfalfal II, and Las Lajas Power Plants, which will empty all sand, silt, and sediment built up during the decantation and storage of water into this watercourse, there will be direct effects on the decantation, clarification, storage, and chlorination structures used to treat our irrigation water to permit risk-free use as drinking water, in compliance with universal practices recommended for similar cases.

A sedimentation study should be presented that will permit the increase in sand, silt, and sediment carried in the water of this river to be gauged. Additionally, please consider economic compensation for this case, in consideration of the harm that will be caused to our decantation, clarification, storage, and chlorination infrastructure, used in the exercise of our end user water rights over water abstracted from the El Manzano Channel Intake

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfal Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This

explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is

- greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (AGU.06.01), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity. Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence. Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted. It can be concluded that the Maipo River system can be managed such that, With the Project operational, present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them. Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

AGU.06.04 Discharge effects

Water capture in advance of in-situ gravel removal leads first to a reduction in sediment load in water carried through the headworks to the turbine rooms, while the solid materials that is retained is returned to the river. At the point where water is discharged from the plants (Las Lajas area), water that has passed through the turbines - which contains a certain quantity of sediment - once again mixes with the water in the rivers, returning to its original conditions in terms of average sediment load (**Addendum, Section I, Question 28**). At the point where water is returned to the Maipo River, in the Las Lajas area, there will be no degradation of the riverbed as it is composed entirely of rocks. It should be mentioned that the flow rate discharged from the PHAM at this point is always lower than the flow rate in the Maipo River just upstream. During the operations phase of the Project, planned maintenance activities do not include any cleaning of tunnels and culverts. Inside the tunnels, the cross sectional area for water flow is small enough to prevent sedimentation. This is shown through the operation of the Alfalfa Plant for 20 years without any cleaning of the tunnels being included among maintenance activities. The only operations that lead to the discharge of sediment are the discharge of gravel traps at the inlets, and the flushing of the sand traps, returning sediment to the river once a certain volume has built up within them. These operations are conducted intermittently and for short time periods (1 minute for sand traps, 10 minutes for gravel traps), at variable frequency depending on the season. For more information see the **Addendum, Section IV, Question 3**.

PRO.01.01 Compensation

The concept of compensation refers to the act of indemnifying damages or harm caused. Within the framework of the EIS, the Project Owner has issued a proposal to the competent authority regarding a suite of environmental management measures aiming to minimize, compensate, and restore the Project's impacts, making their implementation sustainable (Chapter 6 of the EIS). In this regard, compensation is understood to be included in the spirit or end goal of the environmental management measures proposed by the Project Owner, following the evaluation of the direct and indirect effects of the PHAM on each of the environmental components stipulated in Supreme Decree 95, SEIA Regulations.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district. In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district. During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on

mountain sports tourism is available in Annex 35 of the EIS,
"Complementary survey of tourist attractions and tourism services

in the District of San José de Maipo”, and Annex 36 of the EIS, “Survey of high mountain activities”.

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. The study also investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 198 Effects on Water Quality in the Colorado River

In view of the considerable drop in flow rate (up to 12 m³/s) and the increase in sand, silt, and sediment load, the current **physical/chemical, biological, and acidity characteristics of the water will be affected.**

A study should be presented permitting understanding of whether the water will suffer variations in its **physical/chemical, biological, and acidity characteristics**, such that it may be used risk-free, under the parameters of universal practices recommended for similar cases; additionally, please consider **economic compensation for this case, in consideration of the harm that will be caused to our decantation, clarification, and storage infrastructure, used in the exercise of our end user water rights over water abstracted from the El Manzano Channel Intake.**

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum.**

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing

less than 30% of sediment deposited in that zone.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water,

which will pass through the turbines and then be returned to the river. This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.01.01 Compensation

The concept of compensation refers to the act of indemnifying damages or harm caused.

Within the framework of the EIS, the Project Owner has issued a proposal to the competent authority regarding a suite of environmental management measures aiming to minimize, compensate, and restore the Project's impacts, making their implementation sustainable (Chapter 6 of the EIS).

In this regard, compensation is understood to be included in the spirit or end goal of the environmental management measures proposed by the Project Owner, following the evaluation of the direct and indirect effects of the PHAM on each of the environmental components stipulated in Supreme Decree 95, SEIA Regulations.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. The study also investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 199 Effects on Sedimentation Volume due to Actions at Forebays and Sand Traps

Given that the quantity of water to be used in operating discharge spillways into the Colorado River, or the quantity of material and sediment that will build up in the forebay and sand traps of the Alfalfal, Alfalfal II, and Las Lajas Plants, for which rights exist, for maximum periods of 15 minutes 6 times per day, these should be added to the 12 m³/s excess in the river, and the Colorado River will therefore suffer permanent changes in its sedimentological volume (mass and volume, which will result in extreme size and force with no control) flowing into the river, considerably adding to risks affecting the structures of the El Manzano Channel Intake, which is located downstream of these plants.

Economic compensation should be agreed relating to this effect, to cover damage that may be caused to the El Manzano Channel Intake structures by these effects.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfal Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.04 Discharge effects

Water capture in advance of in-situ gravel removal leads first to a reduction in sediment load in water carried through the headworks to the turbine rooms, while the solid materials that is retained is returned to the river. At the point where water is discharged from the plants (Las Lajas area), water that has passed through the turbines - which contains a certain quantity of sediment - once again mixes with the water in the rivers, returning to its original conditions in terms of average sediment load (**Addendum, Section I, Question 28**).

At the point where water is returned to the Maipo River, in the Las Lajas area, there will be no degradation of the riverbed as it is composed entirely of rocks. It should be mentioned that the flow rate discharged from the PHAM at this point is always lower than the flow rate in the Maipo River just upstream.

During the operations phase of the Project, planned maintenance activities do not include any cleaning of tunnels and culverts. Inside the tunnels, the cross sectional area for water flow is small enough to prevent sedimentation. This is shown through the operation of the Alfalfal Plant for 20 years without any cleaning of the tunnels being included among maintenance activities. The only operations that lead to the discharge of sediment are the discharge of gravel traps at the inlets, and the flushing of the sand traps, returning sediment to the river once a certain volume has built up within them. These operations are conducted intermittently and for short time periods (1 minute for sand traps, 10 minutes for gravel traps), at variable frequency depending on the season. For more information see the **Addendum, Section IV, Question 3**.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature

no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned

to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly

frequented, minimizing their visual impact.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1)

Chapter 3 of the EIS provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

PRO.01.01 Compensation

The concept of compensation refers to the act of indemnifying damages or harm caused. Within the framework of the EIS, the Project Owner has issued a proposal to the competent authority regarding a suite of environmental management measures aiming to minimize, compensate, and restore the Project's impacts, making their implementation sustainable (Chapter 6 of the EIS).

In this regard, compensation is understood to be included in the spirit or end goal of the environmental management measures proposed by the Project Owner, following the evaluation of the direct and indirect effects of the PHAM on each of the environmental components stipulated in Supreme Decree 95, SEIA Regulations.

Remark N° 200

Maintenance Program and Emergency Plan

No maintenance program (annual, every five years, etc.) is presented for the Alfalfal II and Las Lajas Plants, or the Las Lajas discharge spillway. Similarly, no emergency plan is presented, for activation in the event of a situation giving rise to a need to shut down the plants or the tunnel.

A maintenance plan and an emergency plan should be attached, providing information on the volume of water to be discharged into the river, and guaranteeing the prevention of damage to structures, buildings, or persons who may be present, or who work in the Colorado River downstream of the discharge point, specifying the measures taken to prevent and mitigate possible emergency situations.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

RSG Risk

The Project Owner possesses a general risk prevention strategy that imposes certain measures on the Project during its different stages of advance. This strategy features the following components:

- a) Measures incorporated into the Project's engineering design.
- b) Systematic verification of compliance with applicable regulations c) Establishment of restricted areas
 - c.1) Area restricted due to their archeological, paleontological, or heritage value
 - c.2) Area of natural value that requires protection by the Project
 - c.3) Officially protected area.
- d) Expert supervision during construction
- e) Training regarding environmentally sensitive issues
- f) Internal risk management and accident prevention programs g) Separation of works installations and encampments

For further information on each of these points, please see **Chapter 7 of the EIS**, which specifies the **Environmental Management Plan**, the **Risk Control and Prevention Plan** designed for the Project, the safety measures to be adopted in light of the risks identified, and, finally, the **Accident control plan**, to be activated in the event of the failure of the preventive measures taken by the Project Owner. Furthermore, **Annex 32 of the EIS** presents the **Risk and Contingency Prevention Plan** for contractors.

RSG.01 Load rejection

During the operation of the power plants, situations may arise that necessitate the stoppage of one or both plants for a certain period of time. Two temporary phenomena occur at such times, the effects of which must be analyzed. These phenomena are mass oscillations within tunnels carrying water under pressure, and impact on the Maipo River system's flow dynamics.

A special situation arises in the operation of a hydroelectric plant when a sudden stoppage occurs affecting its power generation units or discharge spillways. Load rejection can arise as a result of automatic shutoffs caused by internal or external failures:

- Internal. These situations relate to technical problems within the power plant that require the stoppage of the turbines. This can arise due to a mechanical failure (valve or turbine failure) or an electrical fault in the mechanisms that operate the generator units, or in the high tension switchgear (switches or power line distributors).
- External. External events can lead to total system failure (black out), which is a less frequent situation. This can be caused by a break in the power transmission line that serves both power plants.

Fortunately, such events are infrequent; by way of illustration, see **EIS Annex 17, Table 3.1**, which shows a summary of load rejections that occurred at the Alfalfal Power Plant from 2004 to 2007.

For further information on the analyses taken into account for different potential cases of failures in the power generation units in the Alto Maipo plants, please see **Annex 17 of the EIS and Annex 16 of Addendum 1**.

Remark N° 201 Guarantee Regarding Complementary Works Related to the Project

No guarantee is presented regarding the permanent protection of complementary works to be constructed on the **El Manzano Channel**, defined by AES Gener as **SEMI - PERMANENT WORKS** and which will require periodic maintenance and repair.

It should be born in mind that water and water flow are produced by natural effects, and similarly that all effects that arise in watercourses - rock falls, tree falls, stones and rocks, sandbanks, stagnation of waste matter and trash, and deterioration of works installed in the watercourse - are effects attributable to the nature and volume of the water flowing through the river. Engineering installations built in rivers' watercourses can only be obstructed, damaged, or destroyed as a result of the natural effects of the volume and power of water flow.

The Project Owner should expressly agree a compensatory guarantee payable in the event of any situation that impedes the normal abstraction of water under our 16 irrigation rights, permitting 100% coverage of economic aid necessary for maintenance and repair costs affecting the complementary works on the El Manzano Channel for as long as the hydroelectric plants remain operational. This compensatory guarantee shall not be payable in the case of damage caused by earthquakes or catastrophes, as defined by a decree issued by the competent state body.

Thematic responses

Specific response

The Project Owner reiterates its commitment to ensuring that necessary infrastructure exists in the river to permit water to enter the channels at all times, in accordance with the rights granted and the availability of the river throughout the life of the PHAM project.

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in
**Chapter 2 of the
EIS.**

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988),

with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 **“Hanging”** **channels**

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

PRO.01.01 Compensation

The concept of compensation refers to the act of indemnifying damages or harm caused. Within the framework of the EIS, the Project Owner has issued a proposal to the competent authority regarding a suite of environmental management measures aiming to minimize, compensate, and restore the Project's impacts, making their implementation sustainable (Chapter 6 of the EIS).

In this regard, compensation is understood to be included in the spirit or end goal of the environmental management measures proposed by the Project Owner, following the evaluation of the direct and indirect effects of the PHAM on each of the environmental components stipulated in Supreme Decree 95, SEIA Regulations.

Remark N° 202 Guarantee over End User Water Rights

No permanent guarantee is planned covering usage of the 16 irrigation end user water usage rights held by the users of the El Manzano Channel and abstracted through the intake of that channel.

A compensatory guarantee should be agreed, with payments to be made for each day that 100% of the water over which we hold rights is unable to enter the El Manzano Channel Intake, for any reason. This compensatory guarantee shall not be payable in the case of downtime caused by earthquakes or catastrophes, as defined by a decree issued by the competent state body.

Thematic responses

Specific response

The Project Owner reiterates its commitment to ensuring that necessary infrastructure exists in the river to permit water to enter the channels at all times, in accordance with the rights granted and the availability of the river throughout the life of the PHAM project.

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4**

in Chapter 2 of the EIS.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that is, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights

held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.04 Monitoring and control of flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum.**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	Stream gauge station		
	406,157		6,259,100
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum.**

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System

(RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1)

Chapter 3 of the EIS provides detailed information on:

- The legal framework within which the Project was designed;

- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
 - The ways in which the Project will ensure compliance with these regulations.
- The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

PRO.01.01 Compensation

The concept of compensation refers to the act of indemnifying damages or harm caused. Within the framework of the EIS, the Project Owner has issued a proposal to the competent authority regarding a suite of environmental management measures aiming to minimize, compensate, and restore the Project's impacts, making their implementation sustainable (Chapter 6 of the EIS).

In this regard, compensation is understood to be included in the spirit or end goal of the environmental management measures proposed by the Project Owner, following the evaluation of the direct and indirect effects of the PHAM on each of the environmental components stipulated in Supreme Decree 95, SEIA Regulations.

Remark N° 203

Sedimentation: soils and other irrigation structures

No consideration is made regarding the rapid sedimentation that will affect our soils through increases in levels of sand, silt, and other particles carried in our irrigation water, as abstracted from the Colorado River at the El Manzano Channel Intake, settling out in all of our irrigation structures and finally being deposited in our soil - leading to a wide range of problems, such as the blockage or partial blockage of irrigation channels, increases in cleaning costs, reduction in the inherent qualities of agricultural and non-agricultural soils, and other problems that are difficult to classify.

For this reason, a study should be presented evaluating sedimentation across the 292 hectares of land area and the associated irrigation infrastructure that uses water drawn directly from the Colorado River, resulting from increases in levels of sand, silt, and other particles in water running through the El Manzano Channel. Additionally, compensation should be defined corresponding to these effects.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4 in Chapter 2 of the EIS.**

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that is, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum.**

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders

of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and

design" (**Chapter 6.1 of the Sedimentation Study** presented in **Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (**AGU.06.01**), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted.

It can be concluded that the Maipo River system can be managed such that, With the Project operational, present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them.

Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector

environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1)

Chapter 3 of the EIS provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

PRO.01.01 Compensation

The concept of compensation refers to the act of indemnifying damages or harm caused. Within the framework of the EIS, the Project Owner has issued a proposal to the competent authority regarding a suite of environmental management measures aiming to minimize, compensate, and restore the Project's impacts, making their implementation sustainable (Chapter 6 of the EIS).

In this regard, compensation is understood to be included in the spirit or end goal of the environmental management measures proposed by the Project Owner, following the evaluation of the direct and indirect effects of the PHAM on each of the environmental components stipulated in Supreme Decree 95, SEIA Regulations.

Remark N° 204 Loss of Fiscal Holdings

No consideration is given to the loss of fiscal holdings arising through reductions in river and stream flow rates and soil moisture levels caused by the project.

Economic compensation should be agreed, covering the costs of incorporating other spaces into municipal fiscal property holdings, for use in the service of the public at large. E.g. Acquisition and installation of viewpoints along the banks of the Maipo River.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical

variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material**
- b) creation of a viewpoint**
- c) fossil trail**

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

Remark N° 205

Law 19300, General environmental base law, TITLE I, Article 2. "for all legal purposes it should be understood that"...

Environmental damage [is] any significant loss, decline, detriment, or harm caused to the environment, or to one or more of its components.

Environmental Impact Study: A document that provides point by point details of the characteristics of a project or activity planned to be implemented or modified.

It should provide documented background information that can be used to predict, identify, and interpret its environmental impact and describe the action or actions that it shall take in order to prevent or minimize all significant adverse effects.

Environmental impact: alteration of the environment, directly or indirectly caused by a project or activity in a specific area.

Reparation: the act of returning the environment, or one or more of its components, to a state similar to that in which it was to be found before damage caused, or, if this is not possible, the re-establishment of its basic properties.

Article 3. Notwithstanding the sanctions stipulated by law, any person or body that through action or gross negligence causes damage to the environment shall be obliged to make full material reparations, at its own expense, if possible, and to provide compensation as stipulated by law.

Both of the parties (Eduardo Atisha Carrasco as the party affected by water abstraction, and the PHAM owned by AES Gener as the other parties) are aware of the following points. AES Gener holds water rights. Eduardo Atisha Carrasco is the owner of a project approved by the ORD. Ministry of Public Works Document 3238, dated November 07, 1997, issued by the Metropolitan Regional Highways Department. The highways department has approved the installation of a sand trap in the Maipo River, for water decantation, diverting some of the river's flow and channeling it through a sand sedimentation installation to settle out material carried in suspension or dragged along the riverbed, which installation was built and installed in the Maipo River valley, adjacent to the property that I own located at Camino al Volcán N° 22705, District of San José de Maipo; this concession over the usage of an item of national property of public usage for the construction and usage, in accordance with a project plan approved by the River Defense Department, of an aggregates separation facility in the Maipo River, where activities relating to the extraction of aggregates are conducted using mechanized techniques, using for these purposes a truck and a front loader, approved on December 3, 1997. In view thereof, I am the holder of a right that I acquired more than a decade ago.

Therefore:

Under the supposition that the maximum flow rate generated by the project corresponds to the design flow rates of the plants - the Alfalfal II plant, with 27 m /s and the Las Lajas Plant with 65 m /s - this water being sourced from the PHAM's headworks intake system. The sum total design flow rate is calculated to be 69.8 m /s.

Point	Maximum design flow rate calculated in
Colina Stream	6
Las Placas Stream	1
El Morado Stream	3.7
La Engorda Stream	2.1
Yeso River	15
Aucayes Stream	2
Colorado River at Alfalfal	30
Colorado River at Maitenes	10

Question 1: Why is the design flow rate exceeded? Merely from the paragraph shown above (quoted directly from the project presentation in chapter 2.3.20), it is clear that the sum of the Alfalfal II and Las Lajas plants' flow rates is 65 m/s, and excess water will be returned to the watercourses; but how am I to know that the water that the PHAM claims to abstract for energy generation will not be the maximum design flow rate thus calculated?

This flow rate is certainly greater than the 4.8 m/s declared for the intake. What is the real input flow rate? I would also like to ask what you are talking about in Annex 20 of the Project. In the Maipo River Sedimentation Study.

1. Summary and conclusions.

Project impact on the system's sedimentation equilibrium...

In view of the absence of integrated management plans for aggregates extraction activities in the Maipo River, annual extraction rates appear to stand at the very limit of the what is sustainable for the watercourse, as deduced for background information reviewed. In this scenario, any perturbation to the system could lead to local riverbed erosion problems, as has occurred in the past due to overextraction during certain periods. Therefore, if the predicted reductions in sediment availability downstream of the Independent Intake implemented by the project come to pass, then although these variations are relatively minor, they may lead to local problems if measures are not taken to ensure more rational management of the watercourse and available water and aggregates resources. This management should clearly be conducted addressing the river basin as a whole, implemented by the competent authority.

It must be born in mind that whether or not the project goes ahead, in the long term the effects of the dam on the El Yeso River will come to be felt, leading to a state of static shielding, preventing this watercourse from contributing any significant quantity of sediment. This results in an estimated reduction of between 0.2 and 0.5 million tons per year in riverbed erosion and entrainment, for the situation without the current project. It is hard to estimate when this effect will be observed, particularly bearing in mind that after 43 years of operation of the dam, there is as yet no significant evidence of the formation of static shielding.

Finally, it should be mentioned that the morphological conditions of the Maipo River at the point where it leaves the valley are a consequence of the natural reduction in its sediment transport capacity, leading to the deposition of a proportion of its sediment load and the formation of multiple watercourses and islands. In view of its characteristics, the Maipo River (and all of the rivers not subject to intervention, in general) is not static, but rather

continually evolving, in a dynamic equilibrium where in flow rate, sedimentation, and river morphology are permanently interacting and modifying each other. The rate at which the system changes may be altered (and accelerated) if it

sediment transport rates into the system are changed, or in the event of excessive extraction of aggregates from the river, water flow may eventually lead to degradation in certain parts of the river system. However, these effects may be reduced or controlled through suitable management of the system; such management must necessarily be based on integrated perspective, including the entire river system through to the river mouth. In this sense, it can easily be seen that at present no rational management system is applied to the extraction of aggregates in the Maipo River System. When the competent authority grants extraction permits based on local criteria, it fails to take into account the reaction of the system, in both spatial and temporal terms, and movement towards a new equilibrium situation.

Question 2: On what grounds does the competent authority take the decision to grant permits based on local criteria? Does this refer to the criteria applied by the Metropolitan Regional Highways Department, now the Hydraulic Works Department? Or the criteria applied by the Mayor of San José de Maipo? Or do the criteria applied by the Municipal Council take precedence? Or the criteria that should now be applied by CONAMA, under Article 2 of Supreme Decree 95/2001?

Total watercourse erosion and entrainment with the Project operational
The watercourses affected by the project, which will be subject to a drop in transport of sediment in suspension into the Maipo River, are the Volcán, Yeso, and Colorado Rivers. The reduction in the value of solid streambed particle entrainment in the rivers is estimated at 0.05, 0.03, and 0.09 millions of tons per year. The total reduction associated with the project is of the order of 1 million tons per year, representing almost 30% of the predicted value for solid streambed particle entrainment in the Maipo River at Las Vertientes in the absence of the project. The predicted value for solid streambed particle entrainment in the Maipo area at Las Vertientes with the project operational, meanwhile, will be reduced by approximately 2.0 million tons. Adding together the predicted values for solid particle entrainment and suspension particle entrainment, for the situation with the project operational, one obtains a value of approximately 9.6 million tons per year, representing 78% of the value - 12.3 million tons per year - estimated for the situation without the project (that is, a reduction of 22%).

Question 3:

All of this is without having conducted studies in the San José de Maipo or Manzano areas. However, the total value for the sand production industry at El Manzano is known, as the study published by R.E.G. Ingenieros specifies a total of 3 million tons per year.

Subtracting the declared value of the PHAM from this real and serious value, the expected value for solid streambed particle entrainment in the Maipo area at Las Vertientes with the project operational, meanwhile, will be reduced by approximately 2.0 million tons. I am talking about 66.6% less total particle wear and entrainment (including streambed and suspension sedimentology).

Most sediments are transported not in suspension, but rather dragged along the streambed. Therefore, if you take 27.8 cubic meters of water sourced from the 4 streams emptying into the Volcán River, plus water captured from the Yeso River, this is equivalent to 5 times more at the level of San José del Maipo than at the start.

What I want to explain to you in simple terms... Imagine a snowball. If you set it rolling over the snow, it gets bigger in volume until it forms a very large ball. Well, water in the river is the same. The cubic meter that you capture in the Upper Volcán Basin, by the time it gets, for example, to San José de Maipo, is no longer equivalent to a cubic meter; instead, it is equivalent to five cubic meters, at least as it is now carrying rocks, gravel, and sand. This factor is a result of the friction or grinding of the larger rocks that strike against each other, making ever smaller rocks, then gravel, and finally sand. This cycle or mechanism functions if and only if the river has water in it. Do you understand the natural mechanism that underpins the natural law of a watercourse? A sand man like me, with a mechanized extraction technique that only extracts sand during the ice melt season, from November 21 to the first two weeks of February, with the time in December between Christmas and New Year being my most productive season.

Finally, the factor that plays a stabilizing role in the evolution of this watercourse is the natural sedimentation slope gradient, which is unique for each river course like the Maipo River, and forms itself naturally depending on the water flow rate during the flood season in the watercourse, solid streambed particle entrainment and streambed transport granulometry, also naturally forming a particular watercourse width depending on the same factors (Flow Dynamics Theory). In this way, alluvial watercourses naturally form their own stable slope gradient and width, such that total annual sedimentation load brought down to the valley from the high mountains finally reaches the sea, after additional grinding during transport. The slope gradient increases over time, just as the size of particle transported and the width increase as the flow speed in the watercourse declines.

It is this very stability that can be altered by artificial installations. This then leads to a new sedimentation equilibrium slope gradient, and this must therefore be subject to analysis by the PHAM. It is certain that such a "study" relies on very different principles to the documentation presented.

According to the information that you yourselves put forward in Annex 20.

Survey Campaign.

Four survey visits were conducted in the Cajón del Maipo study area - two in September, the third in October, and the final visit in November 2007. These survey studies visited the different stretches of watercourses of interest, running from the Volcán River near the site where the Project's intakes will be installed in the La Engorda Valley, through the Maipo River upstream of the mouth of the Volcán River, to the Yeso River, as well as the Las Vertientes area and the Colorado River between the Maitenes intake and the junction of that river with the Maipo River. Due to heavy snow drifts, during the month of September it was not possible to reach the area where the La Engorda Valley, Colina Stream, and Morado River intakes are to be sited - it was for this reason that it was necessary to make the fourth visit, in November. The October survey visit was conducted together with an external company that conducted topographic and bathymetric surveys in sites selected during previous field visits. The purpose of these field campaigns,

above and beyond gaining a perspective on the study area, was to define the areas where topographic and bathymetric surveys would be necessary, the locations of exploratory trenches, water sediment sampling, and measurements of surface granulometry.

Question 4:

Therefore, please do not talk about four views. There were only three, and you counted wrong because

if it had not been for the snow, as you yourselves admitted, you would not have visited the area in November.

In any event, measurements of this type must be taken between November and February. This is the season when the winter snows melt, and therefore it is at that time that the rivers carry the highest loads of suspended sediment, and studies to determine surface granulometry.

No studies exist regarding San José de Maipo. No records of sediment in suspension exist regarding San José de Maipo.

According to the study by R.E.G. Ingenieros. Mountain foothill sector, from km 190 to km 159: this stretch of the Maipo River, from the Yeso River to the San Carlos Channel Intake, features a narrow watercourse measuring around 100 m in width, well dug into the alluvial and colluvial terraces at the bottom of this mountain foothill valley. It has an average slope gradient of $i = 0.87\%$ formed from a series of whitewater rapids and slow-flowing pools, which exist as a result of massive colluvial blocks of over 5 tons located on the riverbed. Despite the impact of the landslides that occurred in 1987 and 1993, this stretch of the river has remained in the same course since 1979.

Total streambed erosion with the Project operational

Coarse sediment transport from the upper reaches of the Volcán River into the Maipo River currently occurs at a very low level, and this will suffer no significant variation under the project. Sediment transport into the Maipo River from the Yeso and Colorado Rivers will be affected by the project. Sediment transport into the Maipo River from the Yeso and Colorado Rivers will be affected by the project. Under the least favorable calculation model, a reduction of the order of 0.2 to 0.5 million tons per year can be expected in the predicted values for transport from Yeso River, and of the order of

1.4 to 1.8 tons per year in the expected values for transport from the Colorado River, such that the total reduction in expected values for solid streambed erosion in the Maipo area at Las Vertientes is of the order of 2 million tons per year, or equivalent to approximately 22% of the 8.9 million tons per year estimated under the situation without the project.

It then states... The project will not modify water flow rates downstream of the Independent Intake, and therefore the solid erosion capacity of this area will not be affected. If aggregates extraction rates in the area

Question 5:

Does it not strike you as correct for nobody to express an opinion that you or those who have conducted the studies have massaged the information, that is, they have distorted it only so as to favor what the PHAM proposes. For this to be a professional and serious calculation regarding the Maipo River at Las Vertientes, it should include transport of coarse sediment from the Volcán River, the Yeso River, the Maipo River itself, and the Colorado River. Given that strictly speaking it is these four rivers together that feed into the Maipo River in the area that you yourselves mention. This study was not conducted at San Alfonso, and even less at San José de Maipo - which is where it ought to have been conducted, as this is the site of the only sand decantation facility in the entire district of San José de Maipo, which was completed on September 26, 2000. It is at this point that you ought to have mentioned the input of coarse sediment from the Volcán River, the Yeso River, and the Maipo River itself. Did you know that the DOH bases all of its responses to those in the sand extraction industry on an engineering study that the Ministry of Public Works River Works Department, adopting DGOP Resolution N° 776 dated October 23, 1997, and entered into records on November 07, 1997, assigned to R.E.G. Ingenieros?, Are you aware that this study was conducted in the most serious manner possible, as the Ministry of Public Works commissioned it to be conducted regarding the Maipo River and its tributaries as a source of aggregates to supply the Metropolitan Region, Region V, and Region VI?

The need for this study arose from an analysis of the unfavorable balance that exists comparing estimates for production from the Maipo River Basin and the growing demand that underpins the country's development.

The overexploitation of the watercourses would result in subsidence leading to the undermining of riverside infrastructure such as **Intakes**, channels, and bridges, among others. The specific objectives that establish the Terms of Reference are as follows:

- Analysis of the geological characteristics of the area, identifying the regions that are sources of aggregates and proposing methods to determine their production potential.
 - Preparation of a diagnostic model of aggregates extraction from the perspectives of technical, administrative, and economic considerations.
- Proposition of annual aggregates extraction rates for each stretch of the Maipo River and the tributaries in question, such as to ensure a sustainable extractive industry.
- Proposition of a control methodology and an oversight methodology for the extraction of aggregates.
- Analysis of the benefits of aggregates extraction from natural watercourses for each district, taking into account control measures and oversight financed by the municipal government in question or overexploited watercourses.

Question 6:

Do you consider it to be serious and professional to prejudice the economic activity of thousands of families, specifically including my own family, the family of a sand man, this being a PERMANENT source of employment in San José de Maipo for many families that depend on this activity; should such impacts be taken lightly? While a "study" speaks of data without having taken measurements at the control points that should have been recognized.

Table. Average monthly flow rates (cubic m/s) in the Maipo River at San Alfonso, situation without the project (Average)

APR	48.03
MAY	42.47
JUN	41.43
JUL	40.43

AUG
SEP

38.08
43.55

OCT	58.79
NOV	102.58
DEC	151.83
JAN	139.01
FEB	96.92
MAR	68.43
QMA	72,63

Table. Average monthly flow rates (cubic m/s) in the Maipo River at San Alfonso, situation with the project

APR	34.33
MAY	29.28
JUN	30.25
JUL	29.15
AUG	38.08
SEP	43.55
OCT	58.79
NOV	102.58
DEC	151.83
JAN	139.01
FEB	96.92
MAR	68.43
QMA	58.51

Summary of average monthly flow rates in meters/s Maipo River Valley; Source: R.E.G. Ingenieros

APR	45.01
MAY	41.59
JUN	39.68
JUL	36.95
AUG	36.03
SEP	41.16
OCT	61.65
NOV	112.05
DEC	159.69
JAN	143.74
FEB	100.89
MAR	66.29
YEAR	73.73

The areas that are sources of aggregates in the Maipo River Valley are:

- Olivares River.
- Colorado River.
- Barroso River.
- Maipo River.
- Yeso River.
- Clarillo River.

The analysis commissioned by the Ministry of Public Works concludes that, in the Maipo River at El Manzano, it was possible to determine the source of 90% of total aggregates production in the river basin, during the ice melt season (October to March).

For the period from April to September, the Maipo River at El Manzano transports between 30% and 40% of total aggregates production.

I conclude that the "study" presented in the PHAM EIS, in Annex 20, necessarily underestimates real values.

To extract aggregates from the Maipo River, in my case using a mechanized extraction system located above the average water level in the river, so as to avoid seepage from the water table during aggregates production. This depends absolutely on the river rising above the level of my property, carrying 120 cubic meters per second. This is the starting flow rate for it to be possible for me to extract aggregates.

Therefore, when you capture 27.8 cubic meters per second, my only source of income or economic activity disappears. I base this analysis solely on average flow rate information showing that the month of December will be the only month when I will be able to extract aggregates, truthfully only between Christmas and New Year, which is the period when the river carries 150 cubic meters per second on removal of abstracted flow.

In my particular case, what are the thoughts of the PHAM given that it directly affects my activities?

Ladies and gentlemen, you are perhaps all long standing employees of AES Gener, with one, two, ten, or fifteen years in your jobs. When you retire, are fired, or resign, the company will forget you, you are merely cogs in its machine.

My case is different. I am the owner of this property, I have invested years of work, years sacrificing time and my family to get ahead with this sand bank. Money spent implementing this project, which I began to develop in 1996. I defend what is mine, and what has certainly come at a cost to me and my family; I defend the land that I bought; I defend the only thing that I can leave to my children, my grandchildren, and perhaps my great-grandchildren. I defend the only livelihood in which I know how to WORK on what is mine.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them

into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4 in Chapter 2 of the EIS**.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

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Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.06 Sediment**

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study** presented in **Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent

approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of river flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (AGU.06.01), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted.

It can be concluded that the Maipo River system can be managed such that, With the Project operational, present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them.

Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

AGU.06.03 Maipo River Sand Production

With regard to the extraction of aggregates in the Maipo River, during the operations phase of the PHAM, the Project will not modify current natural sediment (aggregates) transport dynamics occurring in the river.

In effect, under the natural dynamics, sediment transport takes place mainly in the months of November, December, and January, as a result of snow and ice melt in the high mountains, and it is during this season that variations in

flow rate in the Maipo River caused by the project stand at their lowest levels. The same behavior applies to winter season rises in river level.

It must be pointed out that the PHAM returns water to the Maipo River in the Las Lajas area, located upstream of the El Canelo zone, and therefore downstream of this point the river's flow dynamics with the project shall be identical to those currently observed.

It is of great importance to observe that currently, without the PHAM in operation, slightly downstream of the Las Vertientes area (in the La Obra stretch of the river), during certain times of the year flow rate in the Maipo River watercourse drops significantly, leaving the river bed dry, due to water abstraction at the following intakes: La Sirena Channel, San Carlos Channel, Independent Intake owned by Aguas Andinas, etc.

Average water abstraction flow rates attributable to the main drinking water and irrigation intakes, many of which also make use of hydroelectric power as a byproduct, but discounting the effects of existing hydroelectric plants on these channels that discharge directly into the intakes, amounts to 113 m³/second, which is equal to the average annual flow rate in the Maipo River at Las Vertientes. Depending on water availability, the annual abstraction rate at these intakes varies between 78 and 164 m³/second.

This situation clearly explains the high level of perturbation observed in the

behavior of the Maipo River watercourse downstream of Las Vertientes, where the riverbed is dry except during periods of increased water level and in unusually wet years.

Remark N° 206

Law 19300, General environmental base law, TITLE I, Article 2. "for all legal purposes it should be understood that"...

Environmental damage [is] any significant loss, decline, detriment, or harm caused to the environment, or to one or more of its components.

Environmental Impact Study: A document that provides point by point details of the characteristics of a project or activity planned to be implemented or modified.

It should provide documented background information that can be used to predict, identify, and interpret its environmental impact and describe the action or actions that it shall take in order to prevent or minimize all significant adverse effects.

Environmental impact: alteration of the environment, **directly or indirectly caused by a project or activity in a specific area.**

Reparation: the act of returning the environment, or one or more of its components, to a state similar to that in which it was to be found before damage caused, or, if this is not possible, the re-establishment of its basic properties.

Article 3: Notwithstanding the sanctions stipulated by law, any person or body that through action or gross negligence causes damage to the environment shall be obliged to make full material reparations, at its own expense, if possible, and to provide compensation as stipulated by law.

- Application of dust suppressant on Route G25 from Romeral to El Yeso 22 Km.
Route G455 from Romeral to Colina 21 Km. Application of bischofite solution (magnesium chloride).

In terms of characteristics, magnesium chloride hexahydrate, or bischofite, is a salt. It possesses a range of properties that permit its potential use as a chemical stabilizer in granular roadways: capacity to absorb and retain water from the surrounding environment, increases in water's surface tension, and reduction in water's vapor pressure. The addition of bischofite permits the creation of a stable roadway, reduces the formation of potholes, corrugation, loss of material, and dust emissions, while improving the driving experience.... **Inorganic stabilizers** include sodium chloride, magnesium chloride hexahydrate, calcium chloride, calcium sulfate, calcium carbonate, phosphoric acid and phosphates, and sodium hydroxide. Disadvantages of the usage of soil stabilizers. The usage of soil stabilizers is restricted by factors relating to soil type and climate conditions. For the soils found in our country, most stabilizers required the addition of fine-grain material, resulting in a disadvantage as against direct application with existing materials.

In terms of the disadvantages of bischofite agents, what is the effect of rainwater runoff from soil treated with bischofite when it makes contact with rivers, streams, springs, groundwater, meadows/wetlands, hot springs, and vegetation, or if animals drink this water after it has been in contact with magnesium chloride?

I request that, in responding to the issue of rainwater, you do not state that bischofite will be applied only in the summer to prevent dust, not in the winter. In the Cajón del Maipo area, it does not only rain during the winter. Rain also falls during the summer months of November, December, January, and February. We are talking about low and high mountain areas, at altitudes of 2000 to 2500 meters.

All of these are present in at least parts of the two stretches of road that will be treated with magnesium chloride.

What is the PM10 or inhalable particulate material? These are particles with diameter equal to or less than 10 microns (a micron is one thousandth of a millimeter). Due to its size, PM10 is capable of entering the human respiratory system. The smaller these particles are, the greater their potential harmfulness to human health. Particulate material can be subdivided into: Coarse fraction: 2.5 to 10 microns. Capable of entering the lungs. Fine fraction: smaller than 2.5 microns. Capable of entering the alveoli, and continuing into the bloodstream.

In the Project, the final value after applying proposed weighting factors, reach values greater than the permissible limit for the emission of inhalable particulate matter (10 tons per year) established by the Atmospheric Decontamination and Pollution Prevention Plan, for all years of Project development.

What will be the real PM10 value after the application of bischofite solution as proposed? Who will take responsibility for this? What will happen if PM10 emissions in the area do not drop below PM10?

- The PHAM, according to available hydrological background information, including a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, and current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself

ANNEX 10

Why does the study mention 50 years? What will happen after the end of this period - will a new study be conducted, will the number of cubic meters that you plan to abstract be increased?

- In terms of winter road clearing, in view of the high-altitude situation. Certain sections of these roads remain closed during the winter season due to landslides, heavy precipitation, and intense snowfall. Annex 2 of the project.

How will you prevent the entry of private individuals into these areas, where the road to El Yeso has always been closed, as road conditions make access impossible, and the department of National Goods segments this area into risk zones?

Route G25 and Route G455 with a width of 7 m, if and only if the 31 kilometers of new road, with a roadway width of 10 m - what is the cause of the 3 extra meters of width in existing roads, as this action has certainly been implemented by the highways department? If these are only to be service roads, they will therefore be closed to the general public (tourists, for example) at the end of the project operations phase. Direct quote from the project documentation... "Only the service roads in the El Yeso - Lo Encañado will have access restricted, barring use by non-project vehicles during the project's operations phase - 4.2 kilometers".

for trucks carrying 12 to 15 cubic meters, as stated in the project documentation. Given that in this area Route G25 is on a slope with no view on either side, running both from San José de Maipo and from Santiago. My question is as to whether the entrances and exits of properties adjacent to this route must comply with the regulations imposed by the Regional Highways Department, and at this precise point there is no space available for the creation of parallel entrances 100 before the main gate.

- Bearing in mind the difference between the use of water rights and water concessions.

I would like to ask what you are talking about in Annex 20 of the Project.

1. Summary and conclusions.

Project impact on the system's sedimentation equilibrium...

In view of the absence of integrated management plans for aggregates extraction activities in the Maipo River, annual extraction rates appear to stand at the very limit of the what is sustainable for the watercourse, as deduced for background information reviewed. In this scenario, any perturbation to the system could lead to local riverbed erosion problems, as has occurred in the past due to overextraction during certain periods. Therefore, if the predicted reductions in sediment availability downstream of the Independent Intake implemented by the project come to pass, then although these variations are relatively minor, they may lead to local problems if measures are not taken to ensure more rational management of the watercourse and available water and aggregates resources. This management should clearly be conducted addressing the river basin as a whole, implemented by the competent authority.

It must be born in mind that whether or not the project goes ahead, in the long term the effects of the dam on the El Yeso River will come to be felt, leading to a state of static shielding, preventing this watercourse from contributing any significant quantity of sediment. This results in an estimated reduction of between 0.2 and 0.5 million tons per year in riverbed erosion and entrainment, for the situation without the current project. It is hard to estimate when this effect will be observed, particularly bearing in mind that after 43 years of operation of the dam, there is as yet no significant evidence of the formation of static shielding.

Finally, it should be mentioned that the morphological conditions of the Maipo River at the point where it leaves the valley are a consequence of the natural reduction in its sediment transport capacity, leading to the deposition of a proportion of its sediment load and the formation of multiple watercourses and islands. In view of its characteristics, the Maipo River (and all of the rivers not subject to intervention, in general) is not

static, but rather continually evolving, in a dynamic equilibrium where in flow rate, sedimentation, and river morphology are permanently interacting and modifying each other. The rate at which the system changes may be altered (and accelerated) if it is perturbed in any way, moving towards new equilibrium situations. Thus, if sediment transport rates into the system are changed, or in the event of excessive extraction of aggregates from the river, water flow may eventually lead to degradation in certain parts of the river system. However, these effects may be reduced or controlled through suitable management of the system; such management must necessarily be based on integrated perspective, including the entire river system through to the river mouth. In this sense, it can easily be seen that at present no rational management

system is applied to the extraction of aggregates in the Maipo River System. When the competent authority grants extraction permits based on local criteria, it fails to take into account the reaction of the system, in both spatial and temporal terms, and movement towards a new equilibrium situation.

On what grounds does the competent authority take the decision to grant permits based on local criteria? Does this refer to the criteria applied by the Metropolitan Regional Highways Department, now the Hydraulic Works Department? Or the criteria applied by the Mayor of San José de Maipo? Or do the criteria applied by the Municipal Council take precedence? Or the criteria that should now be applied by CONAMA, under Article 2 of Supreme Decree 95/2001?

"Environmental impact: alteration of the environment, directly or indirectly caused by a project or activity in a specific area."

Based on the definition of a direct impact, my impact as a sand man, as defined in the previous paragraph.

Who will take responsibility for the domino effect that will result from reduced supply of aggregates only in the Metropolitan Region? Will this be a repeat of the Transantiago project, in which whatever resources are present are taken away? This battle will last for less time!

Have you thought of what will happen if less sand is produced?

...As the river will bring less sand, there will therefore be less supply on the market. What will happen is that the cost per cubic meter will increase. At least the construction industry in the Metropolitan Region has not stagnated, and continues to show an upward trend.

At what time will the company bring together a meeting of those directly affected by this project? At what time will the company bring together a meeting of the sand producers in the Maipo River Valley between Km 190 and Km 150? I ask you, at what time will time be given to talk to me, either by Felipe Naranjo or by Carlos Mathiesen, about my case? This should clearly be before August 27, which is the end date for the citizen participation process.

What was Ms. Patricia Alvarado talking about when, during the citizen participation process held in San Gabriel she said that the river will bring in 15% less, and that from our point of view we would see this as 10 centimeters less, in visual terms.

Has this lady thought about what she is saying? She is stating that the Maipo River has a depth of less than one (1) meter. To be precise, she is saying that the river has a depth of 66.6 centimeters.

I demand that you read what you yourselves as a company have written in the project documentation. To give an example, in an average year the Maipo River

at San Alfonso carries approximately 151.83 cubic meters per second during the month of December. With the project in operation, it will carry 133.10 cubic meters per second. In percentage terms we are talking about 100% and 87.66% of this when the river is carrying a smaller quantity of water, or in other words a 12.34% lower flow rate. However, for example in August, the river carries 38.08 cubic meters per second in the situation without the project. In the situation

with the project this drops to 28.30; in percentage terms we are talking about 100% and 74.31%, in other words a 25.69% drop in flow rate. So as not to sound extremist, let's just take the QMA situation without the project, 72.63 cubic meters per second. QMA situation with the project, 58.51 cubic meters. That is, 19.44% less
In my case, the aggregates extraction months are November, December, January, and February.

Average monthly flow rates (average over 50 years from 1952 to 2002) according to Annex 20 of the Alto Maipo EIS. Maipo River at San Alfonso

Flow rates	November	December	January	February	
Average QMA					
With the Project	91.03	133.10	115.76	76.54	58.51
Without the Project	102.58	151.83	139.01	96.92	72.63
Percentage drop in flow with the Project	11.26%	12.33%	16.73%	21.02%	19.44%

According to average monthly flow rate percentages for other months. It emerges that during the ice melt months, the percentage drop in flow rate with the project will not be so high, but in the months when the Maipo River at San Alfonso carries the lowest flow rate (August) the drop in flow rate with the project represents a much higher percentage.

What I want to say is that water abstraction by the PHAM should vary between the ice melt months and other months, in a directly proportional manner (higher percentage abstraction when flow rate is higher). But according to your own plans it will be INVERSELY PROPORTION (a higher percentage abstraction when flow rate is lower). This makes no sense.

Ladies and gentlemen, perhaps the way you look at things I am an uneducated man. I only got through to the tenth grade at school, my father died when I was three and my mother died when I was 15 years old. Everything that I know I have learned every day of my life. With the experience that I have gained every day that I have lived, I read everything that passes through my hands. Not being an engineer, I would never make a statement as irresponsible as what Madam Patricia said. Do not think of us as small town folk with no education, or as moderately intelligent people who will not be able to understand a simple mathematical ratio.

Have some respect. Even though I am not engineers like you, I could still teach you a lot - including "Don't say something that you don't know about or if you are not 100% informed". Regarding: the concentration of solids in suspension as measured in the study presented in the EIS, Annex 20.

Direct quote:

To suitably analyze Table 7.3 it would be necessary to know the flow rates in each watercourse on the day that the measurements are taken, which information is not available. However, some conclusions can be drawn regarding the data collected. First is the major increase in solids in suspension observed in November, as against September and October, as a result of snow melt. This also reflects the relatively smaller amount produced in the basins associated with the Volcán, Yeso, and Colorado Rivers.

Just one paragraph above, two things have been admitted. First, for a suitable analysis, they have issued a judgment without possessing all of the information. Secondly, the snow melt season is the period when this study really ought to have been conducted, taking samples of all types (flow rate, sediment, solids in suspension or Qss, solid streambed erosion, sediment buildup, granulometric sampling, and topographic, bathymetric, and hydrographic surveys) at a number of measurement points.

Solid streambed erosion is expected in the annex, in part 7.2.

The predicted annual solid suspension entrainment was determined based on prior information, the results of which are summarized in Table 7.1. Table 7.2 shows solid suspension entrainment measured in the Volcán River in 1990, together with routine measurements conducted on the same day at the Maipo River station at San Alfonso and the Colorado River station upstream of the confluence with the Maipo River. Records of the Volcán River at Queltehues cover only a period running up to July 1, 1985, and it is therefore not possible to compare entrainment rates for this station. Despite the limitations of making a comparison of streambed erosion based on a single measurement, this can give an idea of the proportions

of sediment contributed by each watercourse. In this way, the contribution of the Colina Stream to the Maipo River at San Alfonso amounts to approximately 1%, and the contribution of the Volcán River to the Maipo River, at the confluence with the Colina Stream, is around 7%. This value can be compared to the total expected annual contribution, which in this case is 10%.

How can you say that predicted solid streambed erosion at Queltehues is 0.14 if you only have one value, as you yourselves admit in the previous paragraph?

I must once again insist. My statement, made in my previous 9-page citizen participation. I expect serious and real technical responses to my questions. My need, and my real demand, is:

- **Commitment by Alto Maipo AES Gener made to me regarding the direct impact that I will suffer as a result of the project, as the only sand producer whose works have received final acceptance.**
- **Serious responses based on serious studies, without assumptions regarding my questions.**
- **Rigor in all commitments that the EIS says will be made in these fields, and that they be recognized as environmental impact, for instance in the case of PM10.**
- **Rigor in all commitments that the PHAM EIS ought to accept affecting private individuals, as in my own case, as Annex 20 of the EIS has not yet even admitted what impact we will suffer.**

- **Recognition of persons and families that directly depend on aggregates as part of the workforce. We are not talking about very bad, bad, or good wages. We are talking about PERMANENT jobs.**

- **What will happen to supply and demand for aggregates in the Metropolitan Region when the PHAM is operation, and who will absorb the indirect costs associated with the project.**
- **Should the PHAM's water abstraction, in accordance with its rights, not be directly proportional to river flow rate levels? (higher average monthly flow rate, more water abstracted).**

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4 in Chapter 2 of the EIS**.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned,

including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex**

17 of Addendum 1, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.06 Sediment**

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study** presented in **Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence. Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (**AGU.06.01**), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted.

It can be concluded that the Maipo River system can be managed such that, with the project operational, present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them.

Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

AGU.06.03 Maipo River Sand Production

With regard to the extraction of aggregates in the Maipo River, during the operations phase of the PHAM, the Project will not modify current natural sediment (aggregates) transport dynamics occurring in the river.

In effect, under the natural dynamics, sediment transport takes place mainly in the months of November, December, and January, as a result of snow and ice melt in the high mountains, and it is during this season that variations in flow rate in the Maipo River caused by the project stand at their lowest levels. The same behavior applies to winter season rises in river level.

It must be pointed out that the PHAM returns water to the Maipo River in the Las Lajas area, located upstream of the El Canelo zone, and therefore downstream of this point the river's flow dynamics with the project shall be

identical to those currently observed.

It is of great importance to observe that currently, without the PHAM in operation, slightly downstream of the Las Vertientes area (in the La Obra stretch of the river), during certain times of the year flow rate in the Maipo River watercourse drops

significantly, leaving the river bed dry, due to water abstraction at the following intakes: La Sirena Channel, San Carlos Channel, Independent Intake Owned by Aguas Andinas, etc.

Average water abstraction flow rates attributable to the main drinking water and irrigation intakes, many of which also make use of hydroelectric power as a byproduct, but discounting the effects of existing hydroelectric plants on these channels that discharge directly into the intakes, amounts to 113 m³/second, which is equal to the average annual flow rate in the Maipo River at Las Vertientes. Depending on water availability, the annual abstraction rate at these intakes varies between 78 and 164 m³/second.

This situation clearly explains the high level of perturbation observed in the behavior of the Maipo River watercourse downstream of Las Vertientes, where the riverbed is dry except during periods of increased water level and in unusually wet years.

It is for this reason that the Project Owner asserts that its activities will have no impact on the current situation in the sand extraction sites located on the Maipo River.

AGU.06.04 Discharge effects

Water capture in advance of in-situ gravel removal leads first to a reduction in sediment load in water carried through the headworks to the turbine rooms, while the solid materials that is retained is returned to the river. At the point where water is discharged from the plants (Las Lajas area), water that has passed through the turbines - which contains a certain quantity of sediment - once again mixes with the water in the rivers, returning to its original conditions in terms of average sediment load (**Addendum, Section I, Question 28**).

At the point where water is returned to the Maipo River, in the Las Lajas area, there will be no degradation of the riverbed as it is composed entirely of rocks. It should be mentioned that the flow rate discharged from the PHAM at this point is always lower than the flow rate in the Maipo River just upstream.

During the operations phase of the Project, planned maintenance activities do not include any cleaning of tunnels and culverts. Inside the tunnels, the cross sectional area for water flow is small enough to prevent sedimentation. This is shown through the operation of the Alfalfa Plant for 20 years without any cleaning of the tunnels being included among maintenance activities.

The only operations that lead to the discharge of sediment are the discharge of gravel traps at the inlets, and the flushing of the sand traps, returning sediment to the river once a certain volume has built up within them. These operations are conducted intermittently and for short time periods (1 minute for sand traps, 10 minutes for gravel traps), at variable frequency depending on the season. For more information see the **Addendum, Section IV, Question 3**.

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

SLD Health Impact

The Project owner shall take responsibility for ensuring compliance with health and safety regulations, in order to prevent any possible risk to health and physical integrity for the inhabitants of San José Maipo as well as the persons working on the Project.

SLD.02 Atmospheric

Although the Project involves surface construction activities, which will lead to the emission of particulate matter, plans call for the implementation of a suite of mitigation measures that will result in a considerable reduction in emission, not only of the PHAM itself but also as against the baseline of current particulate emissions throughout the Project's area of influence. In addition to the above, these considerations should be evaluated bearing in mind the fact that most of the Project's works will be underground, not producing any emissions of particulate matter.

Conversely, given that most of the Project's works are to be located in high mountain areas, it can be stated that the prevailing ventilation conditions in this environment will facilitate the dispersion of dust, with a natural reduction in emissions during the winter season as a result of the additional moisture contributed by rain and snow precipitation.

For more information on emissions compensation measures, see **Annex 5 of the EIS**.

SLD.02.01 Pollutants

The Project's atmospheric emissions will correspond to dust suspended in the air as a result of earth moving activities (during excavations, loading and unloading, etc.), and the movement of vehicles at surface work areas. Emissions control will be conducted by means of:

- conservation of existing roads currently used by mine trucks,
- all new roads built will be treated with bischofite. Additional information provided in Section I, Question 42 and Section VI, Question 17, in the Addendum.
- use of tarpaulins covering truck loads,
- timely mechanical maintenance of equipment, machinery, and vehicles, and wetting of dusty surfaces

- use of wagons and belt conveyors for the removal of muck

Remark N° 207

Dear Sirs:

I am writing to you in my capacity as chairperson of the El Manzano Channel Irrigation Water Community in order to request that you bear in mind our requirements regarding the **Alto Maipo Project Environmental Impact Study presented by Gener**.

If you read the project documentation presented to CONAMA on May 22, you will see that its information on the project baseline, and the section on identification, prediction, and evaluation of environmental impacts to be generated in our area, are not mentioned - particularly with regard to our irrigation system. Similarly, it fails to address mitigation, much less establishing commitments to solve our problem, or compensation to which our community will have a right if it is affected.

Description of the problem: Our water abstraction system is located in the Colorado River at the 967 meter elevation level, and its structures were built in accordance with the regulations issued by the Directorate General of Water, to capture water from a natural overflow with a minimum height of 0.75 m in the water of the river. The PHAM plans to capture the water of the Colorado River in the Maitenes area, leaving the river with only an ecological flow rate of 0.7 m³/s (defined by the PHAM), plus our rights and the rights of other irrigation users such as the Maurino Channel. Under this situation it will become absolutely impossible for our intake to capture our water rights without the construction of new installations that permit this abstraction.

As an irrigation user community, we consider that **the construction costs pertaining to these works, and the maintenance costs accrued whenever they suffer any degree of total or partial destruction that prevents us from capturing the water over which we hold rights, should be payable in their entirety by the company that generates this impact**, and not the members of our community.

Thematic responses

Specific response

The Project Owner reiterates its commitment to ensuring that necessary infrastructure exists in the river to permit water to enter the channels at all times, in accordance with the rights granted and the availability of the river throughout the life of the PHAM project.

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in
**Chapter 2 of the
EIS.**

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 **“Hanging”** **channels**

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

Remark N° 213

Real Available Water Resources

Baseline studies to define ecological flow rates, taking into account the geology, local soil studies, and impact on flora and fauna, would certainly arrive at much lower figures for real available water resources than those presented in project documentation - what is the real amount of energy that this project can generate?

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS**.

This section presents information characterizing the basins and tributaries of the Volcán, Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex 13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS**.

AGU.03.02 Geology

The baseline studies used in determining the geological characteristics of the Project area are presented in **Section 5.3.6 of the EIS**. Additionally, the **hydro-geological baseline studies** for the Project area are presented in **Section 5.3.5.3 of the EIS**. Complementary information is also provided in **Annex 45 of the EIS**.

Both of these studies start with general background information on the area where the Project is to be installed, going on to present a detailed description of the geological and geomorphological characteristics of specific areas where Project works or activities are planned.

Complementary information is provided in **Annex 8 of the Addendum**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different

sections of these rivers. These Qe zones are defined

in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neoporteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Lilolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant

level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

Remark N° 214 Riverbed Erosion

The lack of water flow will bring about the degradation of the aggregates that form the beds of the rivers and streams that flow together to form the "Maipo", which will aggravate existing problems in bridge pilings, such as the case of the "Los Morros Bridge".

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study** presented in **Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (**AGU.06.01**), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted.

It can be concluded that the Maipo River system can be managed such that, With the Project operational , present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them.

Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

AGU.06.03 Maipo River Sand Production

With regard to the extraction of aggregates in the Maipo River, during the operations phase of the PHAM, the Project will not modify current natural sediment (aggregates) transport dynamics occurring in the river.

In effect, under the natural dynamics, sediment transport takes place mainly in the months of November, December, and January, as a result of snow and ice melt in the high mountains, and it is during this season that variations in

flow rate in the Maipo River caused by the project stand at their lowest levels. The same behavior applies to winter season rises in river level.

It must be pointed out that the PHAM returns water to the Maipo River in the Las Lajas area, located upstream of the El Canelo zone, and therefore downstream of this point the river's flow dynamics with the project shall be identical to those currently observed.

It is of great importance to observe that currently, without the PHAM in operation, slightly downstream of the Las Vertientes area (in the La Obra stretch of the river), during certain times of the year flow rate in the Maipo River watercourse drops significantly, leaving the river bed dry, due to water abstraction at the following intakes: La Sirena Channel, San Carlos Channel, Independent Intake owned by Aguas Andinas, etc.

Average water abstraction flow rates attributable to the main drinking water and irrigation intakes, many of which also make use of hydroelectric power as a byproduct, but discounting the effects of existing hydroelectric plants on these channels that discharge directly into the intakes, amounts to 113 m³/second, which is equal to the average annual flow rate in the Maipo River at Las Vertientes. Depending on water availability, the annual abstraction rate at these intakes varies between 78 and 164 m³/second.

This situation clearly explains the high level of perturbation observed in the behavior of the Maipo River watercourse downstream of Las Vertientes, where the riverbed is dry except during periods of increased water level and in unusually wet years.

It is for this reason that the Project Owner asserts that its activities will have no impact on the current situation in the sand extraction sites located on the Maipo River.

AGU.06.04 Discharge effects

Water capture in advance of in-situ gravel removal leads first to a reduction in sediment load in water carried through the headworks to the turbine rooms, while the solid materials that is retained is returned to the river. At the point where water is discharged from the plants (Las Lajas area), water that has passed through the turbines - which contains a certain quantity of sediment - once again mixes with the water in the rivers, returning to its original conditions in terms of average sediment load (**Addendum, Section I, Question 28**).

At the point where water is returned to the Maipo River, in the Las Lajas area, there will be no degradation of the riverbed as it is composed entirely of rocks. It should be mentioned that the flow rate discharged from the PHAM at this point is always lower than the flow rate in the Maipo River just upstream.

During the operations phase of the Project, planned maintenance activities do not include any cleaning of tunnels and culverts. Inside the tunnels, the cross sectional area for water flow is small enough to prevent sedimentation. This is shown through the operation of the Alfalfa Plant for 20 years without any cleaning of the tunnels being included among maintenance activities.

The only operations that lead to the discharge of sediment are the discharge of gravel traps at the inlets, and the flushing of the sand traps, returning sediment to the river once a certain volume has built up within them. These operations are conducted intermittently and for short time periods (1 minute for sand traps, 10 minutes for gravel traps), at variable frequency depending on the season. For more information see the **Addendum, Section IV, Question 3**.

Remark N° 215 Riverbed Erosion

This will further exacerbate existing damage in the intakes of the channels, which are currently suspended for this very reason, without reaching their objective of connecting to the water flowing through the river.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (**AGU.06.01**), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted.

It can be concluded that the Maipo River system can be managed such that, With the Project operational , present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them.

Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

Remark N° 223 Upper Maipo Basin Area Usage Flow Rate

The project plans establish a total water abstraction rate in the Upper Maipo Basin area of 27 m³/s. The question is: will the management of the El Yeso Reservoir cause any intervention?

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

AGU.05 Drinking water supply

Construction works and/or activities involved in the project (roads, movement of materials, transport of different products, etc) shall have no effect or impact whatsoever on the quality or security/safety of water supply in the Maipo River system. During the construction phase, Project interventions affecting watercourses shall cause only temporary effects resulting from Earth moving during excavation and other construction activities. This intervention shall affect small areas over short time periods, as it shall last only during the period while these installations are under construction (see **Section 6.4.1.4 of the EIS and Section VII, Question 17, in the Addendum**).

During operations, the PHAM shall not affect the Laguna Negra-Lo Encañado and El Yeso Reservoir system, which is managed by the company Aguas Andinas S.A, in its capacity as holder of the drinking water concession for Santiago; nor shall the Project affect the operational dynamics of the drinking water supply system. Therefore, the implementation of the PHAM does not imply any impact whatsoever on the supply of drinking water (see **Section I, responses 27 and 29, in the Addendum**).

Furthermore, the water abstracted by the Project shall be returned to the river 5 km upstream of the Toma Independiente or Independent Intake, operated by the company Aguas Andinas S.A., which abstracts water for drinking water supply to the city of Santiago; therefore, the PHAM shall not affect normal operations of this system. The PHAM shall only affect the delivery point of water in the tributaries of the Maipo River; in other words, water that currently does not drain into the Maipo River shall not be incorporated into that river's total flow.

However, in the event that an incident may arise as a result of an accident during construction, such as accidental spillages or rock falls, the procedures described in the Contingency Plan shall be implemented, consisting of a suite of actions to solve associated problems. This plan is explained in detail in **Chapter 7 of the EIS, Section 7.2.5**.

Remark N° 224 Death of the Lung of Santiago

We live in a heavily polluted metropolis, particularly during the winter. Our escape is to visit the Cajón del Maipo Valley on weekends. A decline in water flow rates will affect the valley's green areas, and the possibility of breathing clean air just 30 minutes from the city.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

SLD Health Impact

The Project owner shall take responsibility for ensuring compliance with health and safety regulations, in order to prevent any possible risk to health and physical integrity for the inhabitants of San José Maipo as well as the persons working on the Project.

SLD.02 Atmospheric

Although the Project involves surface construction activities, which will lead to the emission of particulate matter, plans call for the implementation of a suite of mitigation measures that will result in a considerable reduction in emission, not only of the PHAM itself but also as against the baseline of current particulate emissions through the Project's area of influence. In addition to the above, these considerations should be evaluated bearing in mind the fact that most of the Project's works will be underground, not producing any emissions of particulate matter.

Conversely, given that most of the Project's works are to be located in high mountain areas, it can be stated that the prevailing ventilation conditions in this environment will facilitate the dispersion of dust, with a natural reduction in emissions during the winter season as a result of the additional moisture contributed by rain and snow precipitation.

For more information on emissions compensation measures, see **Annex 5 of the EIS.**

SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS.** Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1.** In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and

prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

SUE.02 Soils, meadows, and wetlands

The Project Owner has conducted a number of studies with the aim of characterizing the vegetation of summer grazing areas (La Engorda) (see details in Addendum 1, Annex 6, and in Chapter 5 of the EIS), as well as flora and vegetation studies in the Project's area of influence (EIS, Chapter 5).

These studies contain information compiled in fieldwork campaigns conducted in Fall 2005, Spring 2006, November 2007, March 15 and 16, 2008, and September 2008, which add to the body of knowledge available regarding vegetation in these areas.

The Lo Encañado area shall be assigned a status of controlled access area for works contractors at all times: it shall not be subject to any intervention whatsoever. For more information on vegetation areas that could be affected by the construction works, and to learn about mitigation measures proposed by the Project Owner, you are advised to review Annex 42 of the EIS and Annex 6 of the Addendum.

With regard to environmental regulations that apply specifically to vegetation and plant life, the Project Owner shall be subject to:

Supreme Decree 366 (Exploitation of Tamarugo, Carob, Chañar, Guayacán, Aextoxicon, Charcoal, Acacia, Boldo, Maiten, Litre, Bollen, and Quillay). This legal instrument governs the felling of trees and bushes.

Supreme Decree 4363 and D.L 701 (Approving the Definitive Text of the Law on Woodland and Regulations on Forest Promotion).

Article 2 of the Woodland Law establishes an obligation that land classified as for preferential woodland land use, as well as natural and artificial woodlands, are subject to woodland management plans approved by the National Forestry Commission (CONAF). Furthermore, Article 21 of Decree Law 701 establishes that any felling or usage of native woodland shall be subject to the CONAF's prior approval of the corresponding management plan.

Decree 82 (Prohibiting the Felling of Trees and Bushes in Indicated Andean High Mountain and Foothill Areas)

Article 102 Sector Environmental Permit (Permit for the felling or exploitation of native woodland, in any type of land, or plantations located in land with preferential characteristics for woodland use).

For further information and analysis on the aforementioned regulations and permits, as applicable to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see Sections 3.2.6 and 3.3.7 in Chapter 3 of the EIS.

Remark N° 225 Disappearance of Native Species

Native trees (Avellano and Maitén) use their roots to absorb deep underground water during times of drought. The reduced flow rate in the rivers will cause the disappearance of these species. Less than 10 years ago we experienced a drought that lasted almost 5 years. This event almost wiped out the Maitén trees in the area, while the Quillay trees survived thanks to their deep roots, and the existence of rivers and aquifers.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03.03 Underground water

Underground water will not be affected in any way by the operation of the Project. This is the case because the underground water flow capacity in each sector of the aquifer associated with the Maipo River is much lower than the minimum flow running through each section of the river, and therefore under all circumstances the aquifers shall remain saturated. Thus, underground water sources present in the area shall also not be affected.

The PHAM plans to construct 70 km of tunnels, of which approximately 50 km correspond to headworks or hydraulic pressure tunnels, the remainder being access tunnels for use during construction of the project and for subsequent operation of the power plants (see **EIS Chapter 5, Section 5.3.5.3**).

Most of these tunnels have been designed to operate at variable internal pressures, with a maximum achieved at certain points of a little more than 450 m. The design requirement for these tunnels is that the lower limit of principal compression in the surrounding rock medium is always less than the operating pressure, such as to maintain a sufficient safety margin to prevent alterations in natural permeability dynamics through hidrojacking. In areas where this design principle is not guaranteed, the Project plans to install impermeable tunnel linings (**EIS, Annex 45.4**).

During the excavation of these tunnels, it is possible that the work front may have to pass through permeable rock strata - leading to seepages of water into the tunnel, the magnitude of which will depend on the permeability of the rock, the depth of the tunnel, and the level of the water table. In some areas, tunnel wall treatments may have to be applied in order to prevent water transfer into or out of the headworks tunnels.

The Project does not plan to make use of any water seepages that may arise, in the generation of electricity. Additionally, the overarching design principles underpinning the Project are oriented towards limiting seepages during construction, in order to establish suitable conditions for efficient tunnel excavation activities. The same principle applies to methods to limit the infiltration of water from the tunnels into the rock mass, thus avoiding water loss during operations.

Additionally, these procedures guarantee that any groundwater that may intercept the tunnels shall suffer no change in its natural hydrological dynamics, or impact on any foreign components or water other than the water entering the system (**EIS, Annex 45**). Special attention will be paid to the quality and characteristics of any water that may eventually return to the natural water system through the tunnel access windows, and therefore construction contracts will specify measurements that must be made and the treatment that shall be required for subsequent disposal of such water, in order to ensure compliance with the quality requirements for water discharge into natural watercourses, under regulations currently in force.

In the event of seepages of water at high temperature and possible acidic composition, it is important to make clear that in general there shall be no major differences in the methods used to render the tunnel walls impermeable. During all site surveys conducted, research boreholes and surface geological maps produced to date applying to the areas through which the tunnels will pass, no evidence whatsoever has been found to lead to any prediction of the presence of water at high temperatures, or with mineral or acidic contamination. As additional background information, during the construction of the Alfalfa Plant - with the excavation of 35 km of tunnels - no events similar to those indicated above occurred. Notwithstanding the above, the specification establish that, in locations located close to potentially critical areas, the contractor must drill survey boreholes of between 25 m and 30 m in length ahead of the tunnel work front, in order to gain early warning of seepage problems and thus be able to apply impermeable tunnel wall treatments as required. See **EIS, Annex 45.4**.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights

held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempe Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum.**

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neoporteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Lilolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4.**

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as

construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

F&F.02.02 Mitigation

Aquatic flora and fauna

The Project calls for a suite of multi-purpose environmental management measures that aim to minimize its effects on living organisms, including: minimization of watercourse areas to be subject to intervention by prioritizing such works for late summer and early fall seasons (period of lowest flow rates), the adoption of special precautions to prevent accidental spillages into watercourses (prohibition of the storage of lubricant drums in or near watercourses, etc), and permanent maintenance of ecological flow rates.

For more detailed information, including technical documentation that complements the information described above, see Annex 17 of the Addendum.

Terrestrial Flora and Vegetation

In order to prevent and/or minimize the Project's effects on plant life, it plans to adopt a number of integrative measures: micro-routing in advance of starting work on-site, in order to identify specimens of plants listed in any conservation category and subject to impact; compensation with the planting of 10 specimens for every one destroyed, in the case of non-woodland species listed for conservation; implementation of a woodland management plan applicable to woodland areas, which describes its measures in accordance with Article 5 of the Woodland Law; implementation of vegetation restoration plans at muck disposal sites, encampments, artificial slopes, and tunnel access terraces (EIS, Annexes 7 and 29). More in-depth information on complementary measures is provided in Annex 6 of Addendum 1.

Terrestrial fauna

Specific wildlife environmental management measures have been proposed for each particular species, taking into account prior experience in the success of these measures in similar projects. These measures will be implemented in continual coordination with the Servicio Agrícola y Ganadero. Principal measures include: capture of individuals belonging to species of conservation interest for rescue and relocation; controlled perturbation actions; and habitat replacement. Other measures are based on the use of signage, training for Contractors, and contractual requirements for on-site supervision (see details in Section 6.4.1.6 of the EIS).

See Annex 4 of the Addendum for the native wildlife rescue and relocation plan.

Remark N° 226 Tourism in the Area

Tourism in the area provides employment for local residents. Lack of water due to reduction in rivers' flow rates will reduce the area's attractiveness. The employment that AES offers for residents of the valley is short term (perhaps 5 years?)

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at

least in part.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **SOC Socio-Economic Impact**

Job creation plans for the district will take into account the concerns expressed by

community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.01 Jobs in the District

Local labor availability is estimated based on figures from the Labor Brokerage and Information Office. This information will be made available to construction contractors so that they can preferentially hire local workers. According to information compiled at the Project Office in San José de Maipo, the project has registered a total of 980 potential project workers, of whom 390 are unemployed, broken down as follows:

Mine workers:	105
Carpenters, Builders, and Rebar Layers:	157
Heavy Machinery Operators:	131
Non-specialized day laborers:	39
Drivers:	87
Specialized technical personnel:	60
Welders:	26
Foremen and supervisors:	7
Graduate professionals:	20
Cleaning, security, and canteen workers:	120
Administrative personnel:	91
Other, misc.:	139

The average project workforce during the construction phase (5 years) is estimated at 2000 persons, and during the Citizen Participation process the company has agreed to ensure that an average of at least 500 local persons will be on the payroll during the construction of the Project.

SOC.01.01 Requirements

In view of the characteristics and scale of the Project, personnel with specific qualifications will be required for the operation and maintenance of plant machinery and equipment, during the operations phase. Conversely, during the Project Construction Phase, it is projected that labor requirements will create jobs not only for mining workers, but also for machinery operators, drivers, and both skilled and unskilled construction personnel, the latter working mainly as day laborers and assistants.

The population of the Project's area of direct influence has been found to possess levels of training and specialization (occupation as defined under the CIIU code) that shall permit them to access both skilled and unskilled work positions created by the Project.

SOC.01.02 Working conditions

To date no schedule exists specifying labor requirements for the full duration of the construction phase. Detailed information specifying jobs created under average and peak labor requirements, broken down by labor requirement dynamics for each encampment, will only be available once the Project Owner has tendered the works contracts.

During the operations phase, it is expected that personnel requirements will amount to approximately 80 positions available, required for power plant operations and maintenance activities. Unlike work positions created during the construction phase, the jobs created in the operations phase will be permanent (EIS, Chapter 6, Section 6.4.2.4).

The Project Owner will provide for coordination between the construction works contractors, the Labor Brokerage Office, and the Municipality of San José de Maipo, regarding local labor required and jobs sought. The PHAM has accepted a commitment to incentivize works contractors to prioritize local contracting of labor required.

No prior training is planned in advance of the Construction Phase. However, such training will form part of the programs implemented in the more advanced phases of the project.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. In parallel, the study investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works,

in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán. For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02

Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 227 Ecological flow rates

I believe that the ecological flow rates set by AES in the project documentation are totally insufficient to guarantee adequate irrigation for the valleys.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that

will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

SUE.02 Soils, meadows, and wetlands

The Project Owner has conducted a number of studies with the aim of characterizing the vegetation of summer grazing areas (La Engorda) (see details in Addendum 1, Annex 6, and in Chapter 5 of the EIS), as well as flora and vegetation studies in the Project's area of influence (EIS, Chapter 5).

These studies contain information compiled in fieldwork campaigns conducted in Fall 2005, Spring 2006, November 2007, March 15 and 16, 2008, and September 2008, which add to the body of knowledge available regarding vegetation in these areas.

The Lo Encañado area shall be assigned a status of controlled access area for works contractors at all times: it shall not be subject to any intervention whatsoever. For more information on vegetation areas that could be affected by the construction works, and to learn about mitigation measures proposed by the Project Owner, you are advised to review Annex 42 of the EIS and Annex 6 of the Addendum.

With regard to environmental regulations that apply specifically to vegetation and plant life, the Project Owner shall be subject to:

Supreme Decree 366 (Exploitation of Tamarugo, Carob, Chañar, Guayacán, Aextoxicon, Charcoal, Acacia, Bolfo, Maiten, Litre, Bollen, and Quillay). This legal instrument governs the felling of trees and bushes.

Supreme Decree 4363 and D.L 701 (Approving the Definitive Text of the Law on Woodland and Regulations on Forest Promotion).

Article 2 of the Woodland Law establishes an obligation that land classified as for preferential woodland land use, as well as natural and artificial woodlands, are subject to woodland management plans approved by the National Forestry Commission (CONAF). Furthermore, Article 21 of Decree Law 701 establishes that any felling or usage of native woodland shall be subject to the CONAF's prior approval of the corresponding management plan.

Decree 82 (Prohibiting the Felling of Trees and Bushes in Indicated Andean High Mountain and Foothill Areas)

Article 102 Sector Environmental Permit (Permit for the felling or exploitation of native woodland, in any type of land, or plantations located in land with preferential characteristics for woodland use).

For further information and analysis on the aforementioned regulations and permits, as applicable to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see Sections 3.2.6 and 3.3.7 in Chapter 3 of the EIS.

Remark N° 228 Water Law

It is against the law to remove water from one river basin and return it in another, which is what this project proposes.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS**.

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT

-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

Remark N° 229 Desertification

The chronic lack of water in the Volcán, Yeso, and Colorado Valleys will lead to the desertification of the Upper Maipo area.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

SUE.02 Soils, meadows, and wetlands

The Project Owner has conducted a number of studies with the aim of characterizing the vegetation of summer grazing areas (La Engorda) (see details in Addendum 1, Annex 6, and in Chapter 5 of the EIS), as well as flora and vegetation studies in the Project's area of influence (EIS, Chapter 5).

These studies contain information compiled in fieldwork campaigns conducted in Fall 2005, Spring 2006, November 2007, March 15 and 16, 2008, and September 2008, which add to the body of knowledge available regarding vegetation in these areas.

The Lo Encañado area shall be assigned a status of controlled access area for works contractors at all times: it shall not be subject to any intervention whatsoever. For more information on vegetation areas that could be affected by the construction works, and to learn about mitigation measures proposed by the Project Owner, you are advised to review Annex 42 of the EIS and Annex 6 of the Addendum.

With regard to environmental regulations that apply specifically to vegetation and plant life, the Project Owner shall be subject to:

Supreme Decree 366 (Exploitation of Tamarugo, Carob, Chañar, Guayacán, Aextoxicon, Charcoal, Acacia, Boldo, Maiten, Litre, Bollen, and Quillay). This legal instrument governs the felling of trees and bushes.

Supreme Decree 4363 and D.L 701 (Approving the Definitive Text of the Law on Woodland and Regulations on Forest Promotion).

Article 2 of the Woodland Law establishes an obligation that land classified as for preferential woodland land use, as well as natural and artificial woodlands, are subject to woodland management plans approved by the National Forestry Commission (CONAF). Furthermore, Article 21 of Decree Law 701 establishes that any felling or usage of native woodland shall be subject to the CONAF's prior approval of the corresponding management plan.

Decree 82 (Prohibiting the Felling of Trees and Bushes in Indicated Andean High Mountain and Foothill Areas)

Article 102 Sector Environmental Permit (Permit for the felling or exploitation of native woodland, in any type of land, or plantations located in land with preferential characteristics for woodland use).

For further information and analysis on the aforementioned regulations and permits, as applicable to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see Sections 3.2.6 and 3.3.7 in Chapter 3 of the EIS.

Remark N° 230 Tourism

Tourism is a major source of income for many persons in the Cajón del Maipo Valley. Changes caused by this project will convert the valley into a place that is very unattractive for tourism.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

**CAL.04 Fostering tourism
in the area**

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **SOC Socio-Economic Impact**

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. In parallel, the study investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 231 Drinking Water and Irrigation Water

The Project represents a threat to the availability of water for residents of Santiago, and will also lead to under-supply of water for irrigation.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see **Table 2.3.4** in **Chapter 2 of the EIS**.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**).

AGU.05 Drinking water supply

Construction works and/or activities involved in the project (roads, movement of materials, transport of different products, etc) shall have no effect or impact whatsoever on the quality or security/safety of water supply in the Maipo River system. During the construction phase, Project interventions affecting watercourses shall cause only temporary effects resulting from Earth moving during excavation and other construction activities. This intervention shall affect small areas over short time periods, as it shall last only during the period while these installations are under construction (see **Section 6.4.1.4 of the EIS and Section VII, Question 17, in the Addendum**).

During operations, the PHAM shall not affect the Laguna Negra-Lo Encañado and El Yeso Reservoir system, which is managed by the company Aguas Andinas S.A, in its capacity as holder of the drinking water concession for Santiago; nor shall the Project affect the operational dynamics of the drinking water supply system. Therefore, the implementation of the PHAM does not imply any impact whatsoever on the supply of drinking water (see **Section I, responses 27 and 29, in the Addendum**).

Furthermore, the water abstracted by the Project shall be returned to the river 5 km upstream of

the
Toma Independiente or Independent Intake, operated by the company Aguas Andinas S.A.,
which abstracts water for

drinking water supply to the city of Santiago; therefore, the PHAM shall not affect normal operations of this system. The PHAM shall only affect the delivery point of water in the tributaries of the Maipo River; in other words, water that currently does not drain into the Maipo River shall not be incorporated into that river's total flow.

However, in the event that an incident may arise as a result of an accident during construction, such as accidental spillages or rock falls, the procedures described in the Contingency Plan shall be implemented, consisting of a suite of actions to solve associated problems. This plan is explained in detail in **Chapter 7 of the EIS, Section 7.2.5**.

AGU.05.01 **Drinking water quality**

The process of hydroelectric power generation does not affect the physical/chemical qualities of water. Additionally, the PHAM does not plan to implement regulation installations that retain sediment. Thirdly, downstream of the discharge point the natural river conditions are maintained with regard to flow rate and physical/chemical properties.

During the construction of installations to be located in watercourses, the free-flowing course of the river is maintained through the construction of diversions through pipes laid along the river course for such purposes, or through channels that divert all flow, allowing free water circulation with no effect whatsoever on quality (see **Section I, Question 28, in the Addendum**).

The Project owner shall not make use of the Lo Encañado Lake or water usage rights owned by Aguas Andinas S.A. for this Project, instead opting to forgo usage of these resources and to replace the role that would have been fulfilled by the Lo Encañado Lake with a forebay located on a widening of the Alfalfal II plant headworks, located in the Alto Aucayes area on the Colorado River Valley (for details, see **EIS 2.2.1**). The Lo Encañado area shall be assigned a status of controlled access area at all times: it shall not be subject to any intervention whatsoever.

The Project Owner has made available a Water Quality Monitoring Program, with specifications for application during both the construction and operations phases. This program espouses a commitment to verify the effectiveness of environmental control measures designed to minimize the effects of works construction activities during the construction phase.

For further information on the Monitoring Program, see **Sections 8.2 and 8.3** in **Chapter 8 of the EIS**.

Remark N° 232 Water Availability

Calculations on water availability are based on elevated values that do not take into account exposure to periods of drought or the phenomenon of global warming.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of

the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists

of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses. Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Northing	Easting
	Alto Volcán		
	406,157	Stream gauge station	6,259,100
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 233 Project

There are no grounds for this project, it carries a high level of environmental impact, and it is not technically feasible.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS**.

This section presents information characterizing the basins and tributaries of the Volcán, Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex

13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS**.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS,**

Chapter 7), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment. The Project will feature a very low percentage of surface works, none of which is

located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neoporteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation

that are not included in the woodland management plan are covered in the revegetation

plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Liolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly

frequented, minimizing their visual impact.

SLD.02 Atmospheric

Although the Project involves surface construction activities, which will lead to the emission of particulate matter, plans call for the implementation of a suite of mitigation measures that will result in a considerable reduction in emission, not only of the PHAM itself but also as against the baseline of current particulate emissions through the Project's area of influence. In addition to the above, these considerations should be evaluated bearing in mind the fact that most of the Project's works will be underground, not producing any emissions of particulate matter.

Conversely, given that most of the Project's works are to be located in high mountain areas, it can be stated that the prevailing ventilation conditions in this environment will facilitate the dispersion of dust, with a natural reduction in emissions during the winter season as a result of the additional moisture contributed by rain and snow precipitation.

For more information on emissions compensation measures, see **Annex**

5 of the EIS.

SLD.03 Acoustic

In the field of Environmental Impact, specifically acoustic impact, the Project Owner has conducted a wide-ranging study to estimate acoustic emissions generated during the construction of the PHAM. For more information on the acoustic impact of the PHAM, and methodologies, modeling techniques, and actions to be taken to minimize such impact, please see **Annex 30 of the EIS** and **Section II, Question 8 in the Addendum**.

Plans for blasting activities, specifically including the frequency, quantity, timing, and work periods of blasting, will be determined on site in accordance with the characteristics of each works activity and work site. Regarding works activity scheduling, priority will be placed on completion of surface works during the daytime (8:00-21:00 hrs.); for blasting activities, plans call for an information program at the time of the activity, defining and clarifying the periods when noise-producing activities will take place, in order to integrate the community into efforts towards the completion of the Project.

Another point worthy of emphasis is that the work sites (tunnel excavation, access windows, and entrances/exits) will not be sited close to settlements, thus preventing most of the potential acoustic impact that could be caused by the PHAM.

Wildlife rescue will be conducted through animal rescue activities based on the trapping of reptiles and amphibians before explosives are used, before service tracks are built, and before the modification of river flow.

Finally, and in order to comply with the requirements set forth above, the Project Owner shall be subject to:

1. Supreme Decree 146 (Establishing Standards on the Emission of Nuisance Noise Generated by Fixed Sources) establishing maximum permissible sound pressure levels, corrected according to technical criteria to evaluate and classify nuisance noises generated by fixed sources affecting the community, such as industrial, commercial, leisure, and artistic activities.
2. Exempt Decree 130 (Establishing restrictions on the movement of cargo trucks). The movement of trucks larger than 4 tons will be suspended from 14:00 hours on Saturdays through to midnight on each Sunday night on Route G-25 and Route G-421.

For more information on the acoustic impact of the PHAM, and regulations (Chapter 6 of the EIS), mitigation measures, methodologies, modeling techniques, and actions to be taken to minimize such impact, please see Annex 30 of the EIS, as mentioned above.

Finally, in order to verify the effectiveness of the mitigation measures taken, noise monitoring will be conducted at 8 sensitive points, following the procedure established in MINSEGPRES Supreme Decree 146/97, in order to verify compliance with the maximum permitted limits for sound pressure level (see details in **Chapter 8 of the EIS, Section 8.2.2**).

SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

TUR.03 Visual impact

The Project Owner has conducted a study to characterize the landscape of the area in which the

Project is to be located, taking into account esthetic and perceptual considerations and

emphasizing the characterization and appraisal of the issues of visibility, quality, and visual fragility of the landscape. In terms of Landscape Alteration or Landscape Impact associated with this infrastructure project, potential effects are classified as either limited duration - generally applying during the construction phase - or permanent, for effects that shall persist during the operations phase and continue throughout the working life of the Project. A qualitative methodology is used to study these effects, whereby the first phase consists of identifying sources of visual impact, and the second phase relates to identifying and classifying environmental impacts. As a general rule, it is assumed that impact on the landscape during the construction phase shall be temporary, mainly due to the transitory nature of the sources of impact, the low level of prior human activity in certain areas, and the relatively low level of physical and visual accessibility of a significant proportion of the area subject to intervention. As most of the Project construction works will be situated underground, during the operations phase the main visual signatures of its existence will be the intakes and access roads. For further information on the methodology used for landscape impact assessment, see **Chapter 6, Section 6.1.4.10 of the EIS, and Annex 17 of Addendum 1.**

Remark N° 234

Flow rates

The Project represents a potential threat to the availability of drinking water for the 6 million people who inhabit the Metropolitan Region.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.05 Drinking water supply

Construction works and/or activities involved in the project (roads, movement of materials, transport of different products, etc) shall have no effect or impact whatsoever on the quality or security/safety of water supply in the Maipo River system. During the construction phase, Project interventions affecting watercourses shall cause only temporary effects resulting from Earth moving during excavation and other construction activities. This intervention shall affect small areas over short time periods, as it shall last only during the period while these installations are under construction (see **Section 6.4.1.4 of the EIS and Section VII, Question 17, in the Addendum**).

During operations, the PHAM shall not affect the Laguna Negra-Lo Encañado and El Yeso Reservoir system, which is managed by the company Aguas Andinas S.A, in its capacity as holder of the drinking water concession for Santiago; nor shall the Project affect the operational dynamics of the drinking water supply system. Therefore, the implementation of the PHAM does not imply any impact whatsoever on the supply of drinking water (see **Section I, responses 27 and 29, in the Addendum**).

Furthermore, the water abstracted by the Project shall be returned to the river 5 km upstream of the Toma Independiente or Independent Intake, operated by the company Aguas Andinas S.A., which abstracts water for drinking water supply to the city of Santiago; therefore, the PHAM shall not affect normal operations of this system. The PHAM shall only affect the delivery point of water in the tributaries of the Maipo River; in other words, water that currently does not drain into the Maipo River shall not be incorporated into that river's total flow.

However, in the event that an incident may arise as a result of an accident during construction, such as accidental spillages or rock falls, the procedures described in the Contingency Plan shall be implemented, consisting of a suite of actions to solve associated problems. This plan is explained in detail in **Chapter 7 of the EIS, Section 7.2.5**.

AGU.05.01 Drinking water quality

The process of hydroelectric power generation does not affect the physical/chemical qualities of water. Additionally, the PHAM does not plan to implement regulation installations that retain sediment. Thirdly, downstream of the discharge point the natural river conditions are maintained with regard to flow rate and physical/chemical properties.

During the construction of installations to be located in watercourses, the free-flowing course of the river is maintained through the construction of diversions through pipes laid along the river course for such purposes, or through channels that divert all flow, allowing free water circulation with no effect whatsoever on quality (see **Section I, Question 28, in the Addendum**).

The Project owner shall not make use of the Lo Encañado Lake or water usage rights owned by Aguas Andinas S.A. for this Project, instead opting to forgo usage of these resources and to replace the role that would have been fulfilled by the Lo Encañado Lake with a forebay located on a widening of the Alfalfa II plant headworks, located in the Alto Aucayes area on the Colorado River Valley (for details, see **EIS 2.2.1**). The Lo Encañado area shall be assigned a status of controlled access area at all times: it shall not be subject to any intervention whatsoever.

The Project Owner has made available a Water Quality Monitoring Program, with specifications for application during both the construction and operations phases. This program espouses a commitment to verify the effectiveness of environmental control measures designed to minimize the effects of works construction activities during the construction phase.

For further information on the Monitoring Program, see **Sections 8.2 and 8.3 in Chapter 8 of the EIS**.

Remark N° 235 Sources of Water Transfer

The company is promoting a project that will construct 70 km of tunnels to transfer water from one river basin to another, which is prohibited under the water law.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

Remark N° 236 Government

What is the Government's defense for the inhabitants of San José, or does it not care whether they die?

Thematic responses

OTR.02 CONAMA

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

Remark N° 237 Water

How is the government going to help if, in the event of drought, this project is going to leave us without water, half of which is used to keep the human population alive and half for the plants? A few years ago there were three years of drought, and they had to bring in water from Santiago so the Quillay plants, which are a protected species, would not dry out.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04.04 Monitoring and control of flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility

(**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility

(**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	Rain gauge station		
	406,157	6,259,100	
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section**

8.2.3).

For more information, see **Annex 17 of the Addendum.**

**F&F Biodiversity Impact
Flora and Fauna**

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempe Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neopteris curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Liolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. In parallel, the study investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 240

Regarding water, the Environmental Impact Study does not specify how the quality of water that is recaptured for treatment and production of drinking water in the area will be affected; nor does it provide a comparison of the situation before and after the construction of the project. Equally, it fails to clearly establish how the implementation of the project will affect the usage of currently held water usage rights, particularly for irrigation users and drinking water supply. It is clear that the Environmental Impact Study does not include measures that will allow ecological flow rates in the river basin to be guaranteed.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in
**Chapter 2 of the
EIS.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical

variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

AGU.05 Drinking water supply

Construction works and/or activities involved in the project (roads, movement of materials, transport of different products, etc) shall have no effect or impact whatsoever on the quality or security/safety of water supply in the Maipo River system. During the construction phase, Project interventions affecting watercourses shall cause only temporary effects resulting from Earth moving during excavation and other construction activities. This intervention shall affect small areas over short time periods, as it shall last only during the period while these installations are under construction (see **Section 6.4.1.4 of the EIS and Section VII, Question 17, in the Addendum**).

During operations, the PHAM shall not affect the Laguna Negra-Lo Encañado and El Yeso Reservoir system, which is managed by the company Aguas Andinas S.A, in its capacity as holder of the drinking water concession for Santiago; nor shall the Project affect the operational dynamics of the drinking water supply system. Therefore, the implementation of the PHAM does not imply any impact whatsoever on the supply of drinking water (see **Section I, responses 27 and 29, in the Addendum**).

Furthermore, the water abstracted by the Project shall be returned to the river 5 km upstream of the Toma Independiente or Independent Intake, operated by the company Aguas Andinas S.A., which abstracts water for drinking water supply to the city of Santiago; therefore, the PHAM shall not affect normal operations of this system. The PHAM shall only affect the delivery point of water in the tributaries of the Maipo River; in other words, water that currently does not drain into the Maipo River shall not be incorporated into that river's total flow.

However, in the event that an incident may arise as a result of an accident during construction, such as accidental spillages or rock falls, the procedures described in the Contingency Plan shall be implemented, consisting of a suite of actions to solve associated problems. This plan is explained in detail in **Chapter 7 of the EIS, Section 7.2.5**.

AGU.05.01 Drinking water quality

The process of hydroelectric power generation does not affect the physical/chemical qualities of water. Additionally, the PHAM does not plan to implement regulation installations that retain sediment. Thirdly, downstream of the discharge point the natural river conditions are maintained with regard to flow rate and physical/chemical properties.

During the construction of installations to be located in watercourses, the free-flowing course of the river is maintained through the construction of diversions through pipes laid along the river course for such purposes, or through channels that divert all flow, allowing free water circulation with no effect whatsoever on quality (see **Section I, Question 28, in the Addendum**).

The Project owner shall not make use of the Lo Encañado Lake or water usage rights owned by Aguas Andinas S.A. for this Project, instead opting to forgo usage of these resources and to replace the role that would have been fulfilled by the Lo Encañado Lake with a forebay located on a widening of the Alfalfa II plant headworks, located in the Alto Aucayes area on the Colorado River Valley (for details, see **EIS 2.2.1**). The Lo Encañado area shall be assigned a status of controlled access area at all times: it shall not be subject to any intervention whatsoever.

The Project Owner has made available a Water Quality Monitoring Program, with specifications for application during both the construction and operations phases. This program espouses a commitment to verify the effectiveness of environmental control measures designed to minimize the effects of works construction activities during the construction phase.

For further information on the Monitoring Program, see **Sections 8.2 and 8.3 in Chapter 8 of the EIS**.

Remark N° 241

The Environmental Impact Study fails to indicate the measures that will be taken in the event that water quality monitoring during the construction and operations phases may record negative findings. Additionally, it fails to indicate the points and frequency at which monitoring will take place; such points should be established at all liquid industrial waste discharge sites, with monitoring on a monthly basis.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds in-stream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate time series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.04 Monitoring and control of flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Q_e) approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
Alto Volcán	Stream gauge station	406,157	6,259,100
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán)		
Alto Volcán	Control Station	407,468	6,259,751

Alto Volcán	La Engorda Intake Control Station	406,780	6,260,782
Alto Volcán	Las Placas Intake Control Station	407,181	6,260,081
Alto Volcán	Colina Intake Control Station	405,768	6,261,231

Yeso River	El Morado Intake Rain gauge station PBN (15)	391,504	6,262,449
Yeso River	Control Station El Yeso Intake	399,666	6,272,077
Colorado River	Stream gauge station El Sauce	380,449	6,287,261
Colorado River	Intake control station Colorado River	389,063	6,292,501

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum.RES Waste**

The Project Owner indicates that most waste generated will be produced during the Project's construction phase. Two types of waste will be produced:

- **Solid waste:**
Construction waste such as wood, piping offcuts, rubble, wires, waste packaging, metals, etc.
Domestic waste or waste similar to domestic waste; plant waste such as remains of shrubs, weeds, and smaller quantities of tree waste removed from work sites.
- **Liquid waste:**
Applicable to the following activities: concrete production, washing and preparation of aggregates, and washing of truck chassis and load beds, machinery, and tools. Other liquid waste relates to wastewater from bathrooms, showers, canteens, and other activities conducted within encampments and site installations.

Gener will place strict contractual requirements on Contractors during the construction phase, aiming to ensure suitable management and final disposal of waste. Additionally, contractors and subcontractors shall agree to comply with regulations and oversight actions established by Law, to be applied to all works of this nature. The planned environmental management manual will prevent the occurrence of any pollution events linked to the Project (**see EIS, Annex 18**).

RES.01 Regulations and Responsibilities

In order to ensure the efficient, safe, and responsible treatment and management of waste matter generated by the PHAM an additional plan has been developed, the "Waste Management Plan for Work Sites, Works Installations, and Encampments", describing the procedures and equipment necessary for the management and disposal of waste produced during the construction of the Project, and which also specifies the responsibilities required under its implementation, what records must be kept, and what reports must be prepared for the purposes of control and oversight (Annex 18 of the EIS).

Gener will enforce implementation and compliance with the Project's environmental measures during construction management, placing strict contractual requirements on Contractors with the aim of ensuring suitable management and final disposal of waste. **RES.02 Location**

a) Handling of solid waste

Infrastructure for the integrated management of solid waste throughout the life of the Project, addressing the full gamut of temporary storage, preparation, and classification for transport, will comprise: waste collection and storage sites at the point where it is generated; areas for non-hazardous waste; and an area for hazardous waste. These waste storage areas, for non-hazardous and hazardous waste, will be located as shown in tables 5.1.1 (pages 7 and 8) and 5.3.1 (pages 11 and 12) in Annex 18 of the EIS, respectively.

Domestic waste and organic waste similar to domestic waste will be disposed of in a sanitary landfill site, while construction waste other than rubble and domestic waste or organic waste similar to domestic waste will be sent to the waste management area for classification, where materials with potential residual value will be returned for reuse or recycling, and the remainder will be dispatched to a sanitary landfill site (Annex 18 of the EIS, page 6).

b) Handling of liquid waste

● **Wastewater**

Wastewater produced in encampments will be subject to primary and secondary treatment, provided by installing modular activated sludge treatment plants at each encampment. These systems are based on unitary operations, with units designed and equipped to treat wastewater input such as to attain a level of purity sufficient for discharge or reuse with no associated risks to persons or to the environment, in full compliance with the regulations stipulated in Supreme Decree 1-90.

Wastewater generated at work areas, through the use of chemical bathrooms, will be transported to by the contractor in wastewater transport trucks to authorized sites for subsequent treatment.

Sludge generated through wastewater treatment will be removed by the works contractor for transport and disposal at authorized sites on a weekly basis. The sludge will be removed in wastewater transport trucks, and in accordance with the volume of sludge

produced it is expected that each encampment will require 2 to 3 journeys by 6 m3 capacity wastewater transport trucks per week, throughout the construction phase. Meanwhile, during the operations phase, the project will use the existing installations at the

existing Alfalfa Plant Control Room, with no requirement to install a new wastewater treatment system, and thus not producing the sludge that such a system would generate.

For more information, see **Annex 18 of the EIS**.

● **Liquid industrial waste**

In view of the characteristics of this type of wastewater, the project plans to install a

sequential sedimentation system. In view of this situation, a settling pond will be installed at each work site to permit the separation of

liquid industrial waste into clear water and settleable sludge. (see **Annex 5 of Addendum 1**)

RES.03 Characteristics

The types of waste to be produced during the construction phase, and the characteristics thereof, are as follows:

Characteristics of solid waste

Solid non-hazardous waste

This class of waste includes:

- Construction waste: consisting of wood, piping offcuts, rubble, wires, waste packaging, metals, empty cans and drums used to transport paint and adhesives, and other similar items.
- Domestic waste and other waste similar to domestic waste: basically includes leftover food from canteens, packaging, paper, card, and similar materials.
- Plant waste: consisting of remains of shrubs, weeds, and smaller quantities of tree waste removed from work sites.

Hazardous solid waste

Types of hazardous waste produced by the Project correspond to waste generated in workshops, storage areas, and work sites, such as:

- Solvents
- Oil waste
- Lubricating grease
- Batteries
- Oil filters

Characteristics of liquid waste

Wastewater

This class of liquid waste relates to wastewater from bathrooms, showers, canteens, and other activities conducted within encampments, site installations, and work sites. This wastewater will be subject to primary and secondary treatment, provided by installing modular activated sludge wastewater treatment plants at each encampment.

Liquid industrial waste

Liquid industrial waste shall be generated only through the following activities: concrete production, washing and preparation of aggregates, and washing of truck chassis and load beds, machinery, and tools.

As a result of this fact, this type of liquid waste shall be generated only at work sites.

Meanwhile, wastewater shall not be produced at the Project's encampments, as these areas shall be used only for personnel lodgings.

For more information, see **Annex 18 of the EIS**.

RES.04 Impact

Gener considers the suitable handling of waste produced by the Project to be of particular importance, and to this end it has designed rigorous programs for the handling, collection and storage, transport, and final disposal, reuse or sale of the different forms of waste that shall be generated at the Project's encampments and site installations, as well as its work sites. These programs have been designed specifically taking into account the particular features of the area where the Project is to be implemented, as well as regulations in force and the requirements imposed by the authorities during the Project's environmental evaluation. In general this category includes non-hazardous waste produced during construction activities and from domestic sources (the latter at workers' encampments), and production of this waste will cease at the end of the construction phase:

- Liquid waste will be reused or disposed of in compliance with applicable sector regulations. All discharge of treated wastewater will be conducted at isolated points, generally without the presence of other human use and with low physical and visual accessibility.
- For both hazardous and non-hazardous waste, the Project Owner plans to transport material for disposal in authorized sites, eliminating the possibility of creating centers of soil or water contamination that might have a negative effect on the quality of the area's scenery. The storage areas, rubble, and other materials stored on a temporary basis within site installations shall be removed once construction activities have been completed, and therefore shall have no impact on the landscape.

Remark N° 242

The Environmental Impact Study fails to indicate waste management procedures to be applied during both the implementation and operations phases of the project, applying to liquid industrial waste produced during activities such as the cleaning of machinery - as well as solid domestic and industrial waste. Equally, it fails to indicate how wastewater produced during the construction phase of the project will be disposed of. In the case of solid industrial waste, it is important to consider measures to comply with SESMA Resolution N° 5081, dated 1993, which establishes procedures for the declaration of solid industrial waste.

Thematic responses

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1)

Chapter 3 of the EIS provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

RES Waste

The Project Owner indicates that most waste generated will be produced during the Project's construction phase. Two types of waste will be produced:

- **Solid waste:**
Construction waste such as wood, piping offcuts, rubble, wires, waste packaging, metals, etc.
Domestic waste or waste similar to domestic waste; plant waste such as remains of shrubs, weeds, and smaller quantities of tree waste removed from work sites.
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Applicable to the following activities: concrete production, washing and preparation of aggregates, and washing of truck chassis and load beds, machinery, and tools. Other liquid waste relates to wastewater from bathrooms, showers, canteens, and other activities conducted within encampments and site installations.

Gener will place strict contractual requirements on Contractors during the construction phase, aiming to ensure suitable management and final disposal of waste. Additionally, contractors and subcontractors shall agree to comply with regulations and oversight actions established by Law, to be applied to all works of this nature. The planned environmental management manual will prevent the occurrence of any pollution events linked to the Project (**see EIS, Annex 18**).

RES.01 Regulations and Responsibilities

In order to ensure the efficient, safe, and responsible treatment and management of waste matter generated by the PHAM an additional plan has been developed, the "Waste Management Plan for Work Sites, Works Installations, and Encampments", describing the procedures and equipment necessary for the management and disposal of waste produced during the construction of the Project, and which also specifies the responsibilities required under its implementation, what records must be kept, and what reports must be prepared for the purposes of control and oversight (Annex 18 of the EIS).

Gener will enforce implementation and compliance with the Project's environmental measures during construction management, placing strict contractual requirements on Contractors with the aim of ensuring suitable management and final disposal of waste. **RES.02 Location**

a) Handling of solid waste

Infrastructure for the integrated management of solid waste throughout the life of the Project, addressing the full gamut of temporary storage, preparation, and classification for transport, will comprise: waste collection and storage sites at the point where it is generated; areas for non-hazardous waste; and an area for hazardous waste. These waste storage areas, for non-hazardous and hazardous waste, will be located as shown in tables 5.1.1 (pages 7 and 8) and 5.3.1 (pages 11 and 12) in Annex 18 of the EIS,

respectively.

Domestic waste and organic waste similar to domestic waste will be disposed of in a sanitary landfill site, while construction waste other than rubble and domestic waste or organic waste similar to domestic waste will be sent to the waste management area for classification, where materials with potential residual value will be returned for reuse or recycling, and the remainder will be dispatched to a sanitary landfill site (Annex 18 of the EIS, page 6).

b) Handling of liquid waste

• **Wastewater**

Wastewater produced in encampments will be subject to primary and secondary treatment, provided by installing modular activated sludge treatment plants at each encampment. These systems are based on unitary operations, with units designed and equipped to treat wastewater input such as to attain a level of purity sufficient for discharge or reuse with no associated risks to persons or to the environment, in full compliance with the regulations stipulated in Supreme Decree 1-90.

Wastewater generated at work areas, through the use of chemical bathrooms, will be transported to by the contractor in wastewater transport trucks to authorized sites for subsequent treatment.

Sludge generated through wastewater treatment will be removed by the works contractor for transport and disposal at authorized sites on a weekly basis. The sludge will be removed in wastewater transport trucks, and in accordance with the volume of sludge

produced it is expected that each encampment will require 2 to 3 journeys by 6 m3 capacity wastewater transport trucks per week, throughout the construction phase. Meanwhile, during the operations phase, the project will use the existing installations at the

existing Alfalfa Plant Control Room, with no requirement to install a new wastewater treatment system, and thus not producing the sludge that such a system would generate.

For more information, see **Annex 18 of the EIS**.

• **Liquid industrial waste**

In view of the characteristics of this type of wastewater, the project plans to install a sequential sedimentation system. In view of this situation, a settling pond will be installed at each work site to permit the separation of liquid industrial waste into clear water and settleable sludge.

(see **Annex 5 of Addendum 1**)

RES.03 Characteristics

The types of waste to be produced during the construction phase, and the characteristics thereof, are as follows:

Characteristics of solid waste

Solid non-hazardous waste

This class of waste includes:

- Construction waste: consisting of wood, piping offcuts, rubble, wires, waste packaging, metals, empty cans and drums used to transport paint and adhesives, and other similar items.
- Domestic waste and other waste similar to domestic waste: basically includes leftover food from canteens, packaging, paper, card, and similar materials.
- Plant waste: consisting of remains of shrubs, weeds, and smaller quantities of tree waste removed from work sites.

Hazardous solid waste

Types of hazardous waste produced by the Project correspond to waste generated in workshops, storage areas, and work sites, such as:

- Solvents
- Oil waste
- Lubricating grease
- Batteries
- Oil filters

Characteristics of liquid waste

Wastewater

This class of liquid waste relates to wastewater from bathrooms, showers, canteens, and other activities conducted within encampments, site installations, and work sites. This wastewater will be subject to primary and secondary treatment, provided by installing modular activated sludge wastewater treatment plants at each encampment.

Liquid industrial waste

Liquid industrial waste shall be generated only through the following activities: concrete production, washing and preparation of aggregates, and washing of truck chassis and load beds, machinery, and tools.

As a result of this fact, this type of liquid waste shall be generated only at work sites.

Meanwhile, wastewater shall not be produced at the Project's encampments, as these areas shall be used only for personnel lodgings.

For more information, see **Annex 18 of the EIS**.

RES.04 Impact

Gener considers the suitable handling of waste produced by the Project to be of particular importance, and to this end it has designed rigorous programs for the handling, collection and storage, transport, and final disposal, reuse or sale of the different forms of waste that shall be generated at the Project's encampments and site installations, as well as its work sites. These programs have been designed specifically taking into account the particular features of the area where the Project is to be implemented, as well as regulations in force and the requirements imposed by the authorities during the Project's environmental evaluation. In general this category includes non-hazardous waste produced during construction activities and from domestic sources (the latter at workers' encampments), and production of this waste will cease at the end of the construction phase:

- Liquid waste will be reused or disposed of in compliance with applicable sector regulations. All discharge of treated wastewater will be conducted at isolated points, generally without the presence of other human use and with low physical and visual accessibility.
- For both hazardous and non-hazardous waste, the Project Owner plans to transport material for disposal in authorized sites, eliminating the possibility of creating centers of

soil or water contamination that might have a negative effect on the quality of the area's scenery.

Remarks and Responses

Remark N° 242 Page 3

The storage areas, rubble, and other materials stored on a temporary basis within site installations shall be removed once construction activities have been completed, and therefore shall have no impact on the landscape.

Remark N° 243

The Environmental Impact Study does not specify the natural watercourses that are to be subject to intervention. In this regard, it is important to bear in mind that the modification of natural watercourses and intakes must be authorized by the Directorate General of Water - and as a result, the sector permits that the Project Owner will have to apply for an obtain must be identified.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant,

and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 244

The Environmental Impact Study does not specify the impact mitigation or compensation measures to be applied to biodiversity impact, bearing in mind that the area where the project is planned to be implemented is located within an Ecological Preservation Area. Furthermore, the Environmental Impact Study baseline information does not include material on the water, plant, and animal life resources in the project's area of influence.

Thematic responses

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles,

70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neopteris curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Lilolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the

sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

F&F.02.02 Mitigation

Aquatic flora and fauna

The Project calls for a suite of multi-purpose environmental management measures that aim to minimize its effects on living organisms, including: minimization of watercourse areas to be subject to intervention by prioritizing such works for late summer and early fall seasons (period of lowest flow rates), the adoption of special precautions to prevent accidental spillages into watercourses (prohibition of the storage of lubricant drums in or near watercourses, etc), and permanent maintenance of ecological flow rates.

For more detailed information, including technical documentation that complements the information described above, see Annex 17 of the Addendum.

Terrestrial Flora and Vegetation

In order to prevent and/or minimize the Project's effects on plant life, it plans to adopt a number of integrative measures: micro-routing in advance of starting work on-site, in order to identify specimens of plants listed in any conservation category and subject to impact; compensation with the planting of 10 specimens for every one destroyed, in the case of non-woodland species listed for conservation; implementation of a woodland management plan applicable to woodland areas, which describes its measures in accordance with Article 5 of the Woodland Law; implementation of vegetation restoration plans at muck disposal sites, encampments, artificial slopes, and tunnel access terraces (EIS, Annexes 7 and 29). More in-depth information on complementary measures is provided in Annex 6 of Addendum 1.

Terrestrial fauna

Specific wildlife environmental management measures have been proposed for each particular species, taking into account prior experience in the success of these measures in similar projects. These measures will be implemented in continual coordination with the Servicio Agrícola y Ganadero. Principal measures include: capture of individuals belonging to species of conservation interest for rescue and relocation; controlled perturbation actions; and habitat replacement. Other measures are based on the use of signage, training for Contractors, and contractual requirements for on-site supervision (see details in Section 6.4.1.6 of the EIS).

See Annex 4 of the Addendum for the native wildlife rescue and relocation plan.

Remark N° 245

The Environmental Impact Study makes no mention of potential impacts that could be generated by the radiation emitted by these power plants, which could affect telecommunications services such as cellular telephones, AM and FM radios, open signal TV, and community radio broadcasters, or other services used by the community of San José de Maipo. As far as the public has been informed, AES Gener S.A. has not conducted studies into these impacts that would make available grounded information on the topic.

Thematic responses

ELE Electrical Installations

The electrical installations presented in the EIS comprise the substation, to be located in the El Sauce area, the characteristics of which are to be found in **Annex 27 of the EIS**; given that the electricity transport layout (cabling and towers) is to be presented to the Environmental Impact Assessment System once all background information is available.

ELE.03 Transmission lines

In view of the project's location, close to Santiago, it is expected that the distance covered by the definitive cabling layout will be short, involving a minimum of sectors not subject to prior intervention. With regard to the specific location of the cabling layout, plans call for the use of the existing high tension power line used by the Queltehues, Volcán, and Maitenes Plants.

Once the layout of the high tension power line has been defined, the Project Owner will submit this plan to the Environmental Impact Assessment System, in accordance with legislation in force. In line with the development of the Compliance Plan for environmental legislation applicable to the Project, the General Regulations applicable in this instance are indicated below:

Decree with Force of Law N°4, dated 05 February, 2007, setting forth the Recast, Coordinated, and Systematized Text of the General Law on Electrical Services.

The General Law on Electrical Services governs the generation, transmission, distribution, and regimen of concessions and tariffs applicable to electrical energy, and the functions of the State with regard to these areas.

Supreme Decree N° 327, Regulations Regarding the General Law on Electrical Services

The Regulations Regarding the General Law on Electrical Services establish, in their 8th Article, that hydroelectric power plants, electrical substations, and transmission lines may be installed without making a request for a concession, when the interested party wishes. These concessions may be provisional (in order to study projects) or definitive. A definitive concession is granted by a supreme decree issued by the Ministry of the Economy, by order of the President of the Republic. Permits relating to electrical installations that do not require concessions are granted by the corresponding Municipal Governments.

For further information and analysis on the aforementioned regulations, with regard to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see **Sections 3.1.6 and 3.1.7 of Chapter 3 of the EIS**, where more detailed versions of this information can be found.

SLD Health Impact

The Project owner shall take responsibility for ensuring compliance with health and safety regulations, in order to prevent any possible risk to health and physical integrity for the inhabitants of San José Maipo as well as the persons working on the Project.

SLD.05 Exposure to electromagnetic fields

As has already been mentioned, the Project's electrical layout design is a topic that is not described in this EIS, as the scope of this Study does not cover such installations.

In parallel with the presentation of the EIS for approval by the SEIA, the Project Owner is simultaneously engaged in the preparation of the basic engineering studies for the electrical layout design that will allow the Project to be connected to the SIC Central Grid. To date no definitive plans exist for the electrical connection layout, but it is still relevant to point out that:

1. In view of the project's location, close to Santiago, it is expected that the distance covered by the definitive cabling layout will be short, involving a minimum of sectors not subject to prior intervention.
2. With regard to the specific location of the cabling layout, plans call for the use of the existing high tension power line used by the Queltehues, Volcán, and Maitenes Plants.
3. According to existing scientific background information, no conclusive evidence current exists showing that electricity transmission systems cause harmful effects through radiation. This assumption is therefore ruled out.
4. Once the layout of the high tension power line has been defined, the Project Owner will submit this plan to the Environmental Impact Assessment System, in accordance with legislation in force.

Remark N° 246

One of the positive socio-economic impacts of the implementation of these power plants will be an input into the SIC Central Grid of 2,500 GWh of electricity per year, from the installed power level of 531 MW. No mention is made of any direct benefit to the users of electrical services in the district of San José de Maipo, which despite becoming an area that makes a significant contribution to electricity generation, faces tariffs set by Decree N° 276/2004 (published in the Official Gazette on 04/11/2004) that are the highest in the Metropolitan Region.

Thematic responses

Specific response

Tariffs for electrical energy used by residents of San José de Maipo are the exclusive responsibility of the company that distributes the power.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative,

that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

Remark N° 247

In terms of socio-economic impact, the Environmental Impact Study does not identify the project's impact on areas dedicated to livestock grazing, such as the Cajón de la Engorda Valley, etc.

Thematic responses

SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

SUE.02 Soils, meadows, and wetlands

The Project Owner has conducted a number of studies with the aim of characterizing the vegetation of summer grazing areas (La Engorda) (see details in Addendum 1, Annex 6, and in Chapter 5 of the EIS), as well as flora and vegetation studies in the Project's area of influence (EIS, Chapter 5).

These studies contain information compiled in fieldwork campaigns conducted in Fall 2005, Spring 2006, November 2007, March 15 and 16, 2008, and September 2008, which add to the body of knowledge available regarding vegetation in these areas.

The Lo Encañado area shall be assigned a status of controlled access area for works contractors at all times: it shall not be subject to any intervention whatsoever. For more information on vegetation areas that could be affected by the construction works, and to learn about mitigation measures proposed by the Project Owner, you are advised to review Annex 42 of the EIS and Annex 6 of the Addendum.

With regard to environmental regulations that apply specifically to vegetation and plant life, the Project Owner shall be subject to:

Supreme Decree 366 (Exploitation of Tamarugo, Carob, Chañar, Guayacán, Aextoxicon, Charcoal, Acacia, Boldo, Maiten, Litre, Bollen, and Quillay). This legal instrument governs the felling of trees and bushes.

Supreme Decree 4363 and D.L 701 (Approving the Definitive Text of the Law on Woodland and Regulations on Forest Promotion).

Article 2 of the Woodland Law establishes an obligation that land classified as for preferential woodland land use, as well as natural and artificial woodlands, are subject to woodland management plans approved by the National Forestry Commission (CONAF). Furthermore, Article 21 of Decree Law 701 establishes that any felling or usage of native woodland shall be subject to the CONAF's prior approval of the corresponding management plan.

Decree 82 (Prohibiting the Felling of Trees and Bushes in Indicated Andean High Mountain and Foothill Areas)

Article 102 Sector Environmental Permit (Permit for the felling or exploitation of native woodland, in any type of land, or plantations located in land with preferential characteristics for woodland use).

For further information and analysis on the aforementioned regulations and permits, as applicable to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see Sections 3.2.6 and 3.3.7 in Chapter 3 of the EIS.

Remark N° 248

The Project Owner makes no mention in the study of the social compensation mechanism that it plans to implement to channel the community support contributions that it has agreed to make, or the number of jobs for local residents and the mechanisms to be used to guarantee such hiring practices.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

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The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

CAL.02 Education

A goal of the Maitenes Foundation relates to education for children and young people against the backdrop of the natural environment (for more information on the goals and achievements of the Foundation, see Annex 26 of the EIS).

Gener firmly believes that contributions to the technical and vocational education and training of young people must keep sight of real employment possibilities. Therefore, as a first initiative it has earmarked resources for an education improvement project in the district, which will contribute to establishing education management for the restructuring of the school curriculum and professional technical capacity building, taking into account the features needed to boost local employability. Based on information and recommendations from this study, Gener, acting through the Maitenes Foundation, will undertake a Capacity Building for Employability Program fundamentally oriented towards those whose family, social, or economic situation has barred them from completing their education and training, or acquiring the skills needed in order to find work. **SOC Socio-**

Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.01 Jobs in the District

Local labor availability is estimated based on figures from the Labor Brokerage and Information Office. This information will be made available to construction contractors so that they can preferentially hire local workers. According to information compiled at the Project Office in San José de Maipo, the project has registered a total of 980 potential project workers, of whom 390 are unemployed, broken down as follows:

Mine workers:	105
Carpenters, Builders, and Rebar Layers:	157
Heavy Machinery Operators:	131
Non-specialized day laborers:	39
Drivers:	87
Specialized technical personnel:	60
Welders:	26
Foremen and supervisors:	7
Graduate professionals:	20
Cleaning, security, and canteen workers:	120
Administrative personnel:	91
Other, misc.:	139

The average project workforce during the construction phase (5 years) is estimated at 2000 persons, and during the Citizen Participation process the company has agreed to ensure that an average of at least 500 local persons will be on the payroll during the construction of the Project.

Remark N° 249

During the citizen participation process, the company has expressed its willingness to consider contributions in the district of San José de Maipo over a ten year period, without taking into account that the average operational lifespan of projects of this type runs to over 50 years of useful life; this social organization has therefore stated that the minimum period for compensation to the community to be promised should be at least 30 years.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

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Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

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Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. Details are provided regarding the principal characteristics of

this program in **Chapter 8, Section 8.2.7 of the EIS**, and in **Annex 39 of the EIS**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

Remark N° 250

In order to monitor the ecological flow rates defined by the Directorate General of Water, it is requested that monitoring stations with satellite technology be installed to monitor the main tributaries of the Maipo River subject to intervention under the project (Volcán, Yeso, and Colorado Rivers).

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility

(Addendum, Section 5, Question 2).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility

(Addendum, Section 5, Question 2).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	Rain gauge station		6,259,100
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 251

A periodic monitoring committee should be created, with the participation of social organizations in the country that are currently inscribed as legally registered bodies, to control and verify compliance with the commitments adopted by the Project Owner in environmental and social matters.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

Remark N° 252

Finally, CONAMA should transcribe the corresponding environmental classification resolution regarding commitments adopted by the Project Owner regarding environmental impact mitigation and social compensation for the community of San José de Maipo.

Thematic responses

OTR.02 CONAMA

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

Remark N° 253 Ecological Flow Rate and Watercourse Flow Velocity

Please explain and provide a justification for how the ecological flow rate of 0.7 m³/s in the Colorado River will meet day to day demand in the El Manzano irrigation channel, given that no part of the project documentation makes reference to maintenance activities between the river and the channel during the useful life of the project.

Additionally, please provide modeling results and an explanation of what the different watercourse flow velocities will be, comparing the current situation with a situation with the minimum ecological flow rate at the El Manzano Channel intake. This model and explanation should consider the damage caused to the channel itself, and the measures that the project shall include for application throughout its working life to ensure that such damage does not occur - for example, sediment buildup that is not currently considered. According to the DGA, it is known that the impact on habitat conditions arising as a result of reduction in flow rate in the ecosystem can only be determined by analyzing river flow velocity and depth. In this context, the critical variables are river depth, in which area migratory processes up and down the river require a minimum depth of 20 cm (according to the DGA and Swiss legislation); while in terms of flow velocity, the direct influence affects plant and animal habitat conditions, leading to changes in the species present in the environment depending on organisms' adaptation to variations in flow velocity. A details clarification of the situation in the El Manzano irrigation channel is requested.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at

least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Q_e) approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán	Stream gauge station	6,259,100
	406,157		
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers,

calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.

2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information

on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998). As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity. It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence. Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area. The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (AGU.06.01), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity. Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence. Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted. It can be concluded that the Maipo River system can be managed such that, With the Project operational, present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them. Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

AGU.06.03 Maipo River Sand Production

With regard to the extraction of aggregates in the Maipo River, during the operations phase of the PHAM, the Project will not modify current natural sediment (aggregates) transport dynamics occurring in the river. In effect, under the natural dynamics, sediment transport takes place mainly in the months of November, December, and January, as a result of snow and ice melt in the high mountains, and it is during this season that variations in flow rate in the Maipo River caused by the project stand at their lowest levels. The same behavior applies to winter season rises in river level. It must be pointed out that the PHAM returns water to the Maipo River in the Las Lajas area, located upstream of the El Canelo zone, and therefore downstream of this point the river's flow dynamics with the project shall be identical to those currently observed. It is of great importance to observe that currently, without the PHAM in operation, slightly downstream of the Las Vertientes area (in the La Obra stretch of the river), during certain times of the year flow rate in the Maipo River watercourse drops significantly, leaving the river bed dry, due to water abstraction at the following intakes: La Sirena Channel, San Carlos Channel, Independent Intake owned by Aguas Andinas, etc. Average water abstraction flow rates attributable to the main drinking water and irrigation intakes, many of which also make use of hydroelectric power as a byproduct, but discounting the effects of existing hydroelectric plants on these channels that discharge directly into the intakes, amounts to 113 m³/second, which is equal to the average annual flow rate in the Maipo River at Las Vertientes. Depending on water availability, the annual abstraction rate at these intakes varies between 78 and 164 m³/second. This situation clearly explains the high level of perturbation observed in the behavior of the Maipo River watercourse downstream of Las Vertientes, where the riverbed is dry except during periods of increased water level and in unusually wet years. It is for this reason that the Project Owner asserts that its activities will have no impact on the current situation in the sand extraction sites located on the Maipo River.

AGU.06.04 Discharge effects

Water capture in advance of in-situ gravel removal leads first to a reduction in sediment load in water carried through the headworks to the turbine rooms, while the solid materials that is retained is returned to the river. At the point where water is discharged from the plants (Las Lajas area), water that has passed through the turbines - which contains a certain quantity of sediment - once again mixes with the water in the rivers, returning to its original conditions in terms of average sediment load (**Addendum, Section I, Question 28**). At the point where water is returned to the Maipo River, in the Las Lajas area, there will be no degradation of the riverbed as it is composed entirely of rocks. It should be mentioned that the flow rate discharged from the PHAM at this point is always lower than the flow rate in the Maipo River just upstream. During the operations phase of the Project, planned maintenance activities do not include any cleaning of tunnels and culverts. Inside the tunnels, the cross sectional area for water flow is small enough to prevent sedimentation. This is shown through the operation of the Alfalfal Plant for 20 years without any cleaning of the tunnels being included among maintenance activities. The only operations that lead to the discharge of sediment are the discharge

of gravel traps at the inlets, and the flushing of the sand traps, returning sediment to the river once a certain volume has built up within them. These operations are conducted intermittently and for short time periods (1 minute for sand traps, 10 minutes

for gravel traps), at variable frequency depending on the season. For more information see the **Addendum, Section IV, Question 3.**

**F&F Biodiversity Impact
Flora and Fauna**

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

Remark N° 254

Indicate the guarantee of water usage availability in the El Manzano irrigation channel, and how compliance is to be established and regulated

In the event that the PHAM indicates that there will be no variations in river flow velocity, it is requested that the study clearly indicate how this will be demonstrated, such that it does not occur in the El Manzano irrigation channel. Considering that the Water Code clearly expresses that the abstraction and replacement of water must always be conducted in such a way as not to affect the rights held over the same water by third parties, in terms of quantity, water quality, usage availability, and other aspects. In this regard. How and in what does Gener provide a guarantee to the El Manzano channel users that the irrigation channel over which they hold water rights shall always be available for use, abstracting water from the Colorado River? What regulation system will apply if the above is not respected or complied with? Where is this commitment set forth?

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services. For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry. In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively. Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 from the year 1990, in the Public Registry of Water Usage Rights, maintained by the Public Water Registry (Catastro Público De Aguas) (**see the Addendum, Section V, Question 24, Part vi**).

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4**

in Chapter 2 of the EIS.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own

rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 “Hanging” channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project’s area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

AGU.04.04 Monitoring and control of flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Q_e) approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the

watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility
(Addendum, Section 5, Question 2).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

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Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Northing	Easting
	Alto Volcán		
	406,157	Stream gauge station	6,259,100
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 255

Information on the Social Evaluation of the Project and the Monetary Value of Planned Mitigation Measures

It is required that the PHAM clearly indicate, in its report or special text, how the project has been socially valued at social market prices, using a quantitative and not descriptive or qualitative methodology, addressing not only benefits and expenditure but also social costs in different areas where different public bodies have issued remarks, and in different fields. If the project value amounts to US\$ 700 million, what is the value of the wide range of mitigation measures planned for implementation?

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term

mutually beneficial relationships between the project and its surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

PRO.01.01 Compensation

The concept of compensation refers to the act of indemnifying damages or harm caused. Within the framework of the EIS, the Project Owner has issued a proposal to the competent authority regarding a suite of environmental management measures aiming to minimize, compensate, and restore the Project's impacts, making their implementation sustainable (Chapter 6 of the EIS).

In this regard, compensation is understood to be included in the spirit or end goal of the environmental management measures proposed by the Project Owner, following the evaluation of the direct and indirect effects of the PHAM on each of the environmental components stipulated in Supreme Decree 95, SEIA Regulations.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. In parallel, the study investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 256
Information on Social Costs with Monetary Linkages to Variations in the Wide Range of Variable that the PHAM will Modify in its Area of Influence

It must be made a matter of public information whether or not the required mitigation measures have been valued and quantified, applying to the project and its area of influence, which is taken into account in a number of fields that have been made public in the study and by CONAMA on its web page at <https://www.e-seia.cl/documentos/documento.php?idDocumento=2933048>, and whether the social costs have been identified, associated with modifications in a wide range of variables that will be affected, and therefore pertaining to a situation that currently does not exist. A specific table indicating these valuations and the variations in the current and future situation is requested.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent

decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

PRO.02 EIS Additional and Complementary Information

In accordance with consultation procedures conducted by oversight services, further studies and information have been incorporated into Addendum 1, which complements existing information provided in the EIS. Regarding ecological flow rates (**Annex 17**), cultural heritage (**Annex 14**) and the management of summer grazing areas (**Annex 6**).

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. In parallel, the study investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 257

Information on the Year in which Mitigation Expenditure will be Recouped

As the project is to make a profit, it would be interesting to know in what year the project becomes economically profitable for GENER, and in what year the company will recoup expenditure on mitigation.

Thematic responses

Specific response

Information on the profitability of the Project is confidential to the Project Owner in all cases, but as the Project Owner is a registered company, its financial statements are issued on an annual basis.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate

for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

Remark N° 258

Request and Verification of Adequate Response to Sernatur Ord. N° 392, 09/07/2008

The Project Owner is requested to provide clear and detailed information as required by the National Tourism Service Metropolitan Region Office Coordinator in Ordinary Communication N° 392, dated July 09, 2008, in all point, and particularly in point 2, with remarks on all paragraphs thereof. It is a fundamental point that CONAMA is the sole point of contact for this process, and this body has experts in different fields who take into account the issues raised by SERNATUR in order to ensure that the responses issued by GENER are correct, relevant, and technically verified such as to guarantee that none of the issues mentioned in the Ordinary Communication indicated above shall occur.

Thematic responses

OTR Other

This section relates to certain special situations that could not be categorized, or that are linked to specific requests, disqualifications, or situations that feature a clear political component, against either the environmental authority or the Project Owner.

OTR.02 CONAMA

Remark N° 259

Information on the Existence of and Identification of the Social Costs of Variables Affected by the PHAM

Information is requested based on the social evaluation methodologies used by MIDEPLAN in the evaluation of projects presented by private interests, including whether or not the social costs associated with modifications in the wide range of variables subject to impact under the PHAM have been identified, relating to lower river water flow rates, channel installations, changes in sediment erosion and transport, etc.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. Details are provided regarding the principal characteristics of

this program in **Chapter 8, Section 8.2.7 of the EIS**, and in **Annex 39 of the EIS**.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. In parallel, the study investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 260

What is the certainty that PHAM 2008, with a lower ecological flow rate than PHAM 2007, will provide sufficient water at the El Manzano Intake to provide for rights held

Information is required regarding how the PHAM will ensure that channel intakes, particularly the El Manzano Channel Intake, will receive all of the water stipulated in their water rights, in a situation with a proposed ecological flow rate in the Colorado River that is lower in the second project proposal than it was in the first - which was withdrawn early this year.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see **Table 2.3.4**

in Chapter 2 of the EIS.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project

to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the

Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and**

Section IV, Question 5.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

AGU.04.04 Monitoring and control of flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Q_e) approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
Alto Volcán	Stream gauge station	406,157	6,259,100
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán)		
Alto Volcán	Control Station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control Station	406,780	6,260,782
	Las Placas Intake		

Alto Volcán	Control Station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control Station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449

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Yeso River	PBN (15) Control Station El Yeso Intake	399,666	6,272,077
Colorado River	Stream gauge station El Sauce	380,449	6,287,261
Colorado River	Intake control station Colorado River	389,063	6,292,501

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 261

Why does the PHAM not plan for the maintenance of the El Manzano Channel Intake

Information is required regarding why PHAM planned expenditure on new installations does not cover the maintenance and operation of the link between the Colorado River and the currently existing channel for the entire lifespan of the Project.

Thematic responses

Specific response

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

Remark N° 262
Request and Verification of Adequate Response to Sernatur Ord. N° 148,
11/07/2008 of the
DGA Conservation Department and PRH

A clear, detailed, and specific response is requested regarding how the PHAM will guarantee the requirement stipulated in Point 6 of the remarks made in Ordinary Communication 148, dated July 11, 2008, issued by the DGA Conservation Department and PRH, for the specific case of the El Manzano Irrigation Channel.

Thematic responses

Specific response

The Project Owner reiterates its commitment to ensuring that necessary infrastructure exists in the river to permit water to enter the channels at all times, in accordance with the rights granted and the availability of the river throughout the life of the PHAM project.

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources.

During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at

least in part.

Remark N° 263

An Explanation is Requested Regarding Measures to be Applied in the Colorado River due to the Risk of Mass Flow Removal

Given that the DGA itself indicates that the Colorado River presents a risk of mass flow removal, the PHAM is requested to indicate in details what technical measures, emergency plans, and specific mitigation measures are to be applied and administered such that the El Manzano Irrigation Channel suffers no impact in the arrival of water through its intake throughout the useful lifespan of the project.

Thematic responses

Specific response

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in **Chapter 2 of the EIS**.

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

PRO.01.01 Compensation

The concept of compensation refers to the act of indemnifying damages or harm caused. Within the framework of the EIS, the Project Owner has issued a proposal to the competent authority regarding a suite of environmental management measures aiming to minimize, compensate, and restore the Project's impacts, making their implementation sustainable (Chapter 6 of the EIS).

In this regard, compensation is understood to be included in the spirit or end goal of the environmental management measures proposed by the Project Owner, following the evaluation of the direct and indirect effects of the PHAM on each of the environmental components stipulated in Supreme Decree 95, SEIA Regulations.

Remark N° 264
Request and Verification of Adequate Response to Sernatur Ord. N° 148,
11/07/2008 of the
DGA Conservation Department and PRH

A clear, detailed, and specific response is requested regarding the requirements stipulated in point Point 33 of the remarks made in Ordinary Communication 148, dated July 11, 2008, issued by the DGA Conservation Department and PRH. In this regard it is vital that information is included on the analysis conducted into impact affecting the specific case of the El Manzano Irrigation Channel. If such analysis has not been conducted, it is hereby requested, to include all mitigation measures that may be necessary.

Thematic responses

Specific response

The Project Owner reiterates its commitment to ensuring that necessary infrastructure exists in the river to permit water to enter the channels at all times, in accordance with the rights granted and the availability of the river throughout the life of the PHAM project.

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

Remark N° 265

Request for Quantitative Evaluation of the Impact of Changes in Sedimentation Dynamics in the Colorado River Upstream and Downstream of the El Manzano Intake with an Ecological Flow Rate that has yet to be Approved by the DGA

It is requested that the PHAM be expanded to indicate the quantitative and not descriptive evaluation of the impact of changes in the sedimentation dynamics that will occur in the Colorado River upstream and downstream of the El Manzano Irrigation Channel, with the minimum ecological flow rate.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (**AGU.06.01**), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence. Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are

attributable more to the ways in which aggregates are extracted from river than to quantities extracted.

It can be concluded that the Maipo River system can be managed such that, With the Project operational , present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them.

Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

AGU.06.04 Discharge effects

Water capture in advance of in-situ gravel removal leads first to a reduction in sediment load in water carried through the headworks to the turbine rooms, while the solid materials that is retained is returned to the river. At the point where water is discharged from the plants (Las Lajas area), water that has passed through the turbines - which contains a certain quantity of sediment - once again mixes with the water in the rivers, returning to its original conditions in terms of average sediment load (**Addendum, Section I, Question 28**).

At the point where water is returned to the Maipo River, in the Las Lajas area, there will be no degradation of the riverbed as it is composed entirely of rocks. It should be mentioned that the flow rate discharged from the PHAM at this point is always lower than the flow rate in the Maipo River just upstream.

During the operations phase of the Project, planned maintenance activities do not include any cleaning of tunnels and culverts. Inside the tunnels, the cross sectional area for water flow is small enough to prevent sedimentation. This is shown through the operation of the Alfalfal Plant for 20 years without any cleaning of the tunnels being included among maintenance activities.

The only operations that lead to the discharge of sediment are the discharge of gravel traps at the inlets, and the flushing of the sand traps, returning sediment to the river once a certain volume has built up within them. These operations are conducted intermittently and for short time periods (1 minute for sand traps, 10 minutes for gravel traps), at variable frequency depending on the season. For more information see the **Addendum, Section IV, Question 3**.

Remark N° 266

Indicate or Clarify Requirements Upstream and Downstream of the El Manzano Intake

The PHAM does not indicate or clarify and/or evaluate the effects of the project on the solid transport dynamics upstream and downstream of the El Manzano Intake; an analysis is requested investigating effects on the erosion-sedimentation equilibrium, and knock-on effects downstream of the project in the area indicated, as well as measures to reduce any deterioration in this issue.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (**AGU.06.01**), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with

and without the Project, in the Project's area of influence.
Watercourse degradation problems and effects on certain Highway
infrastructure installations, which can be observed currently downstream of
Las Vertientes, are attributable more to the ways in which aggregates are

extracted from river than to quantities extracted.
It can be concluded that the Maipo River system can be managed such that, With the Project operational , present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them.
Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

AGU.06.04 Discharge effects

Water capture in advance of in-situ gravel removal leads first to a reduction in sediment load in water carried through the headworks to the turbine rooms, while the solid materials that is retained is returned to the river. At the point where water is discharged from the plants (Las Lajas area), water that has passed through the turbines - which contains a certain quantity of sediment - once again mixes with the water in the rivers, returning to its original conditions in terms of average sediment load (**Addendum, Section I, Question 28**).

At the point where water is returned to the Maipo River, in the Las Lajas area, there will be no degradation of the riverbed as it is composed entirely of rocks. It should be mentioned that the flow rate discharged from the PHAM at this point is always lower than the flow rate in the Maipo River just upstream.

During the operations phase of the Project, planned maintenance activities do not include any cleaning of tunnels and culverts. Inside the tunnels, the cross sectional area for water flow is small enough to prevent sedimentation. This is shown through the operation of the Alfalfal Plant for 20 years without any cleaning of the tunnels being included among maintenance activities.

The only operations that lead to the discharge of sediment are the discharge of gravel traps at the inlets, and the flushing of the sand traps, returning sediment to the river once a certain volume has built up within them. These operations are conducted intermittently and for short time periods (1 minute for sand traps, 10 minutes for gravel traps), at variable frequency depending on the season. For more information see the **Addendum, Section IV, Question 3**.

Remark N° 267

Clarify why the irrigation usage situation in the El Manzano area is not analyzed under mitigation measures

Sections of the Maipo River and other watercourses that will be affected in this regard are identified, with a system of zoning according to irrigation usage. What will happen in the specific case of El Manzano?

Thematic responses

Specific response

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in
**Chapter 2 of the
EIS.**

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural

conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 268

Explain how irrigation in El Manzano is guaranteed with the proposed ecological flow rate

As established in the project documentation, which indicates that one of the watercourses subject to intervention is El Manzano, both directly and indirectly, it would be interesting to know how the proposed ecological flow rate will ensure compliance with the ecological functions and services of this watercourse. If the answer is affirmative, how will this be ensured?

Thematic responses

Specific response

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4 in Chapter 2 of the EIS**.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that is, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**).

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river

flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams. It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Q_e) approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
	Rain gauge station	406,157	6,259,100
Alto Volcán	Control station	407,468	6,259,751
Alto Volcán	Control station	406,780	6,260,782
Alto Volcán	Control station	407,181	6,260,081
Alto Volcán	Control station	405,768	6,261,231
Yeso River	Rain gauge station	391,504	6,262,449
Yeso River	Control station	399,666	6,272,077
Colorado River	Rain gauge station	380,449	6,287,261
Colorado River	Intake control station	389,063	6,292,501

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 269

Why is the San José de Maipo Master Plan not considered in the PHAM?

Why does the PHAM not consider the San José de Maipo Master Plan project for the El Manzano area, prepared by the company XEREX, supported by the Housing Ministry SEREMI for the Metropolitan Region, which recognizes that a problem exists relating to water shortages, and when the irrigation channel itself represents an alternative source of treated water for sanitation and human consumption?

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see **Table 2.3.4**

in Chapter 2 of the EIS.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that is, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River,

in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfafal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfafal I Power Plant, and shall make use of water abstracted from

the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **PRO The Project**

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly

frequented, minimizing their visual impact.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1) **Chapter 3 of the EIS** provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

Remark N° 270

What actions are to be taken regarding future wear and tear to the road surface of Route G-25

According to background information provided in the PHAM documentation, the project's impact on roads is estimated based on saturation points. In this regard, the Project Owner is requested to present a justification for not taking into account wear and tear on the road surface resulting from the implementation of the Project. With regard to road wear, please state how the project will manage deterioration in the road infrastructure of Route G-25.

Thematic responses

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayes, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions.

The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS**.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

VIA.04 Damage to roads and trails

The level of intervention to be generated by the Project was determined based on levels of saturation and deterioration of service levels, arising as a result of vehicle traffic caused by the Project - this Project highway impact analysis therefore did not take into account wear and tear on the road surface, as this parameter is not relevant when truck traffic complies with weight limits established by the Ministry of Public Works' Highways Department. In this regard, the Project Owner will permanently supervise weight control, in order to ensure compliance with the stipulations made in Ministry Public Works Supreme Decree 158/1980 which establishes gross weight limits for highways, as well as Decree 200, dated July 1993 and Decree 396, dated November 1993, establishing gross weight limits for urban streets. In both cases vehicle weight may not exceed 45 tons. For more information on measures planned by the Project Owner to ensure compliance with these regulations, see specific information in **Chapter 3 of the EIS**.

Furthermore, the Project Owner plans to undertake the conservation of Route G-25 (El Volcán area) and Route G-455 to the El Yeso Reservoir. Details of the current condition of each of these routes and planned road conservation measures, see the Road Improvement Program, in **Annex 19 of the EIS**.

Finally, in advance of the start of road conservation activities, the corresponding Projects were approved by the Santiago Metropolitan Region Regional Highways Department. With regard to areas of interest for tourism, the conservation of part of the highway network and year-round maintenance of the more remote stretches of Route G-455 to El Yeso and Route G-25 from El Yeso Bridge to the El Volcán area will improve accessibility, favoring an increase in influx of visitors or the arrival of visitors over lengthier periods of the year, as these areas are largely inaccessible to tourists for a significant part of the winter season.

Remark N° 271 Monographs required in the PHAM

Do plans exist for a monograph on the road surface of Route G-25 before starting work on the project? If the answer is negative, why not?

Thematic responses

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayes, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions. The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS**.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

VIA.04 Damage to roads and trails

The level of intervention to be generated by the Project was determined based on levels of saturation and deterioration of service levels, arising as a result of vehicle traffic caused by the Project - this Project highway impact analysis therefore did not take into account wear and tear on the road surface, as this parameter is not relevant when truck traffic complies with weight limits established by the Ministry of Public Works' Highways Department. In this regard, the Project Owner will permanently supervise weight control, in order to ensure compliance with the stipulations made in Ministry Public Works Supreme Decree 158/1980 which establishes gross weight limits for highways, as well as Decree 200, dated July

1993 and Decree 396, dated November 1993, establishing gross weight limits for urban streets.

In both cases vehicle weight may not exceed 45 tons. For more information on measures planned by the Project Owner to ensure compliance with these regulations, see specific information in **Chapter 3 of the EIS**.

Furthermore, the Project Owner plans to undertake the conservation of Route G-25 (El Volcán area) and Route G-455 to the El Yeso Reservoir. Details of the current condition of each of these routes and planned road conservation measures, see the Road Improvement Program, in **Annex 19** of the EIS.

Finally, in advance of the start of road conservation activities, the corresponding Projects were approved by the Santiago Metropolitan Region Regional Highways Department. With regard to areas of interest for tourism, the conservation of part of the highway network and year-round maintenance of the more remote stretches of Route G-455 to El Yeso and Route G-25 from El Yeso Bridge to the El Volcán area will improve accessibility, favoring an increase in influx of visitors or the arrival of visitors over lengthier periods of the year, as these areas are largely inaccessible to tourists for a significant part of the winter season.

Remark N° 272

Indicate real quantity of trucks to be used

The quantity of trucks to be used transporting explosives should be specified, as such transport will be required at a number of work sites; for this purpose, please indicate a) number of trucks to be used for each purpose, b) characteristics of the trucks, c) routes to be taken from the supplier to the work site, d) frequency (daily and weekly), and e) time period during which this activity will take place.

Thematic responses

RSG Risk

The Project Owner possesses a general risk prevention strategy that imposes certain measures on the Project during its different stages of advance. This strategy features the following components:

- a) Measures incorporated into the Project's engineering design.
- b) Systematic verification of compliance with applicable regulations c)
Establishment of restricted areas
 - c.1) Area restricted due to their archeological, paleontological, or heritage value
 - c.2) Area of natural value that requires protection by the Project
 - c.3) Officially protected area.
- d) Expert supervision during construction
- e) Training regarding environmentally sensitive issues
- f) Internal risk management and accident prevention programs g)
Separation of works installations and encampments

For further information on each of these points, please see **Chapter 7 of the EIS**, which specifies the **Environmental Management Plan**, the **Risk Control and Prevention Plan** designed for the Project, the safety measures to be adopted in light of the risks identified, and, finally, the **Accident control plan**, to be activated in the event of the failure of the preventive measures taken by the Project Owner. Furthermore, **Annex 32 of the EIS** presents the **Risk and Contingency Prevention Plan** for contractors.

RSG.02 Transport of Hazardous Substances

As indicated in **Section 2.4.1 of the EIS**, fuel will be supplied in tanker trucks owned by the distributor companies, from their centers in the Metropolitan Region to the areas of site installations and encampments.

The project will comply fully with Supreme Decree 298/95 of the Ministry of Transport and Telecommunications, which regulates procedures for the transport of cargo containing substances the characteristics of which render them hazardous or represent risks to health, safety, and the environment, on roads and highways, as stated in **Section 3.2.8 of the EIS**. The frequency of journeys and routes for the transport of explosives shall be defined by the contractor depending on its construction scheduling. The Project Owner will report these aspects to the environmental authorities.

All explosive products will be transported in conformity with Supreme Decree 72/1985 of the Ministry of Mining, Law 17,798 and complimentary regulations, and NCH 385/Of.55. Safety Measures in the Transport of Flammable and Explosive Substances.

Each Contractor must obtain the necessary permits for transport and suitable storage of explosives required at different work areas. The frequency of journeys and routes for the transport of explosives shall be defined by the contractor.

Annex 32 of the EIS and Section I, Question 57 in the Addendum show the risk prevention measures that the project will adopt in order to avoid the spillage of hazardous substances during transport.

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

Remark N° 273 Missing information from PHAM EIS required, for new models and Simulations

Clarification is requested regarding point 2.4.1 E) "Additional Road Traffic Related to the Project" for the construction phase, regarding the number of journeys started each day (external flow) for concrete transport, presented in Table 2.4.1.1, "Supplies Required for the Construction of the Project" and what relationship exists between the 1,690,000 m³ reported in this table (equivalent to approximately 6040 truckloads per year) and the 60,000 tons of cement indicated in Table 2.3.1.3. Why has this not been taken into account in the highway impact study?

Thematic responses

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**.

The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.03 Congestion

When PHAM Project construction activities begin, there will be an increase in road traffic movements in the immediate surroundings of the work area. This vehicle movement will be related mainly to the transport of supplies and machinery to the works installations, transport of excavation spoil to muck deposition sites, and, to a lesser extent, the transport of personnel to the work sites. For more information on traffic flow increases resulting from the Project, see **Chapter 2, section 2.4.1, part E, Annex 14 of the EIS, and Annexes 9 and 14 of Addendum 1**.

The PHAM highway impact analysis takes into account all works and activities under the Project, including the transport of supplies, machinery, and personnel. According to modeling studies, it is predicted that there will be no significant impact on highway usage (levels of saturation of new and existing roads and intersections). For more information on the Project's road operations, measurements used and models derived, see **Annexes 9 and 15 of the Addendum**. Additionally, increases in noise emissions are analyzed in **Section 6.4.1.2 of the EIS**.

Notwithstanding the above, it is assumed that, given that certain construction activities shall be conducted at the same times that other road users wish to make use of certain sections of specific roads, a certain level of annoyance may be caused, and for this reason the PHAM has adopted a number of control and mitigation measures indicated in **Chapters 6 and 2 of the EIS** and in **Annex 14 of the EIS**, as well as **Annexes 9 and 17 of Addendum 1**.

It is considered likely that, in view of the predominance of the tourist industry in the local economy of the district of the Maipo Valley, a certain level of annoyance may be caused at certain points and at specific moments, mainly due to conflicts between PHAM road usage and the movements of visitors. As indicated in the EIS Baseline Study, this is an area where tourists come to enjoy walks and peace and quiet, on weekends and holidays. In particular, there are 2 specific tourism attractions located in the same areas as site installations: The El Yeso and the Alto Volcán area, where special measures shall be taken, as specified in **Chapter 6 of the Project EIS**.

Additionally, **Annex 32 of the EIS** specifies emergency procedures to be adopted in the event of transport accidents caused by project vehicles.

Remark N° 274 Lack of analysis of road safety on Route G-25

Considering that Route G-25 is a route that, although during the week it features varied and significant traffic during the early hours of the morning, given that it consists of a road surface with lanes, from the first bridge at the eastern end of Route G-25, with two way traffic and a variety of gradients and curves, from a road safety perspective it is necessary to possess information on why truck traffic from La Florida or Puente Alto heading eastwards is not eliminated, as shown in the plan in the file 3119_02_1*.pdf, shown in Appendix 3 of the highway impact study

Thematic responses

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayes, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions.

The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS**.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

VIA.03 Congestion

When PHAM Project construction activities begin, there will be an increase in road traffic movements in the immediate surroundings of the work area. This vehicle movement will be related mainly to the transport of supplies and machinery to the works installations, transport of excavation spoil to muck deposition sites, and, to a lesser extent, the transport of personnel to the work sites. For more information on traffic flow increases resulting from the Project, see **Chapter 2, section 2.4.1, part E, Annex 14 of the EIS, and Annexes 9 and 14 of Addendum 1**.

The PHAM highway impact analysis takes into account all works and activities under the Project, including the transport of supplies, machinery, and personnel. According to modeling studies, it is predicted that there will be no significant impact on highway usage (levels of saturation of new and existing roads and intersections). For more information on the Project's road operations, measurements used and models derived, see **Annexes 9 and 15 of the Addendum**.

Additionally, increases in noise emissions are analyzed in **Section 6.4.1.2 of the EIS**.

Notwithstanding the above, it is assumed that, given that certain construction activities shall be conducted at the same times that other road users wish to make use of certain sections of specific roads, a certain level of annoyance may be caused, and for this reason the PHAM has adopted a number of control and mitigation measures,

indicated in **Chapters 6 and 2 of the EIS** and in **Annex 14 of the EIS, as well as Annexes 9 and 17 of Addendum 1**.

It is considered likely that, in view of the predominance of the tourist industry in the local economy of the district of the Maipo Valley, a certain level of annoyance may be caused at certain points and at specific moments, mainly due to conflicts between PHAM road usage and the movements of visitors. As indicated in the EIS Baseline Study, this is an area where tourists come to enjoy walks and peace and quiet, on weekends and holidays. In particular, there are 2 specific tourism attractions located in the same areas as site installations: The El Yeso

and the Alto Volcán area, where special measures shall be taken, as specified in **Chapter 6 of the Project EIS**. Additionally, **Annex 32 of the EIS** specifies emergency procedures to be adopted in the event of transport accidents caused by project vehicles.

Remark N° 275

Lack of a project for road signage and markings on Route G-25, for trucks heading east to west and vice versa

Traffic signage and waypoints that are proposed ought to be covered in a specific project, indicating the measures, location, and type of reflectance of the sign material, which should be of high intensity or category G3, with an anti-graffiti protective film in the works area.

Thematic responses

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.01 Regulations

For information on road and transport regulations in force and applicable to the project, see **Chapter 3, point 3.2**, "Specific environmental regulations applicable to the Project", and the EIS.

The Project Owner stipulates that:

- Crossroad and junction signage projects linked to public roads will fully comply with the requirements established by the Highways Department, particularly in relation to intersection regulation, and regulatory, preventive, and informative signage, and geometric aspects, such as turning radius and lane channeling. For more information, see **Annex 14 of the EIS and Section I, Question 38 in the Addendum**.
- With regard to site installation supply lines, in the event that such lines are installed alongside roadways, prior authorization will be obtained from the Highways Department.
- The Project Owner will permanently supervise weight control, in order to ensure compliance with the stipulations made in Ministry Public Works Supreme Decree 158/1980 which establishes gross weight limits for highways, as well as Decree 200, dated July 1993, and Decree 396, dated November 1993, establishing gross weight limits on urban roads. In both cases vehicle weight may not exceed 45 tons.
- In the event that the transport of supplies and equipment for the construction phase, as a result of the size and/or weight of items to be transported, requires loads above and beyond those stipulated in regulations, the corresponding authorization will be requested from the Highways Department and applicable safety measures will be agreed on a case by case basis.
- As indicated in **sections 2.5.3 and 6.4.1.1 of the EIS**, trucks carrying material at all locations apart from work areas, and all trucks on public highways, will be covered with tarpaulins in order to avoid the spillage of material, in compliance with Decree 75 and 1987 of the Ministry of Transporting I communications, which indicates that "loads must be covered with a suitably sized canvas sheet or tarpaulin, such as to avoid the emission particulate matter into the air", as indicated in section **3.2.1 of the EIS**.
- The Project will comply with the stipulations of Decree 18 2001 and subsequent amendments, prohibiting the movement of cargo vehicles within the Anillo Américo Vespucio ring road.

Within the framework of the SEIA and the environmental requirements and/or conditions imposed by the Authorities at the time of approving the Project, the Project Owner confirms and accepts ultimate responsibility relating to transport and any contingency or accident that may arise and/or cause damage to the environment or third parties and that is linked to works and activities undertaken as part of the PHAM, as required in conformity with legislation in force. This does not affect collective liability and compliance that, regardless of the SEIA, is established under the Civil Code and administrative procedures in this field.

Remark N° 276 Lack of analysis of road safety on Route G-25

A response is required regarding whether road signage and highways defenses on the current Route G-25 was or was not analyzed, as the current situation is plagued by siting problems, poor maintenance, and the absence of items that lead to potential accident risks affecting vehicle traffic moving in both directions, regularly endangering light vehicles and heavy trucks moving along a route with many gradients, curves, and - during the winter - areas where ice and snow may occur at certain points and along certain stretches of the road. A response is required regarding the nature of the analysis and consideration made by the PHAM in this regard, and also regarding its responsibility to maintain the road's signage and defenses, repairing damage and low visibility caused by graffiti, mud, and loss of reflectance. Notwithstanding the fact that road maintenance is the responsibility of the Highways Department, under the circumstances under which the PHAM will use that road, it should administer measures necessary to mitigate current deficiencies and to avoid risks to those who are not connected to the project; to this end consideration should be given to the stipulations made in the Highways Signage Manual, Chapters 2, 3, and 5. See http://www.conaset.cl/cms_conaset/jsp/pagina.jsp?secc=10&zona=10&ctnd=342

Thematic responses

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.01 Regulations

For information on road and transport regulations in force and applicable to the project, see **Chapter 3, point 3.2**, "Specific environmental regulations applicable to the Project", and the EIS.

The Project Owner stipulates that:

- Crossroad and junction signage projects linked to public roads will fully comply with the requirements established by the Highways Department, particularly in relation to intersection regulation, and regulatory, preventive, and informative signage, and geometric aspects, such as turning radius and lane channeling. For more information, see **Annex 14 of the EIS and Section I, Question 38 in the Addendum**.
- With regard to site installation supply lines, in the event that such lines are installed alongside roadways, prior authorization will be obtained from the Highways Department.
- The Project Owner will permanently supervise weight control, in order to ensure compliance with the stipulations made in Ministry Public Works Supreme Decree 158/1980 which establishes gross weight limits for highways, as well as Decree 200, dated July 1993, and Decree 396, dated November 1993, establishing gross weight limits on urban roads. In both cases vehicle weight may not exceed 45 tons.
- In the event that the transport of supplies and equipment for the construction phase, as a result of the size and/or weight of items to be transported, requires loads above and beyond those stipulated in regulations, the corresponding authorization will be requested from the Highways Department and applicable safety measures will be agreed on a case by case basis.
- As indicated in **sections 2.5.3 and 6.4.1.1 of the EIS**, trucks carrying material at all locations apart from work areas, and all trucks on public highways, will be covered with tarpaulins in order to avoid the spillage of material, in compliance with Decree 75 and 1987 of the Ministry of Transporting I communications, which indicates that "loads must be covered with a suitably sized canvas sheet or tarpaulin, such as to avoid the emission particulate matter into the air", as indicated in **section 3.2.1 of the EIS**.
- The Project will comply with the stipulations of Decree 18 2001 and subsequent amendments, prohibiting the movement of cargo vehicles within the Anillo Américo Vespucio ring road.

Within the framework of the SEIA and the environmental requirements and/or conditions imposed by the Authorities at the time of approving the Project, the Project Owner confirms and accepts ultimate responsibility relating to transport and any contingency or accident that may arise and/or cause damage to the environment or third parties and that is linked to works and activities undertaken as part of the PHAM, as required in conformity with legislation in force. This does not affect collective liability and compliance that, regardless of the SEIA, is established under the Civil Code and administrative procedures in this field.

Remark N° 277

Incorrect vehicle measurements in the study, they should be corrected and a new study conducted Highway Impact Study

In accordance with evaluation methodologies for highway projects both with and without reassignment (Sectra 1988) and MINTRATEL (SEREMI RM), set forth in the Manual of Procedures and Methodology for Studies on Impact on the Urban Transport System, it is indicated that analyses of models and simulations should be based on current and up-to-date information. The PHAM project plans to break ground after the end of 2008. In the highway impact study, the measurements used are the same as those used for the first PHAM project, which was withdrawn by the Project Owner - as shown in the file Part A: Transit Measurements, dated November 23, 2006, and modeled in SIDRA software on December 26, 2007. New traffic measurements should be made, and similarly the models should be reformulated, given that along the transport axis of Av. La Florida recent years have seen greater demand for alternative routes, as well as a major growth in housing density in a number of areas that were less populated in 2006 than in 2008. One piece of background information that demonstrates the random nature of the measurement system can be observed regarding Route G-455, running to the El Yeso Reservoir, for which one record dates back to November 16, 2007, and the others are from 2006; while the implementation of the project, if approved, will theoretically start in 2009.

Thematic responses

PRO.02 EIS Additional and Complementary Information

In accordance with consultation procedures conducted by oversight services, further studies and information have been incorporated into Addendum 1, which complements existing information provided in the EIS. Regarding ecological flow rates (**Annex 17**), cultural heritage (**Annex 14**) and the management of summer grazing areas (**Annex 6**).

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**.

The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.03 Congestion

When PHAM Project construction activities begin, there will be an increase in road traffic movements in the immediate surroundings of the work area. This vehicle movement will be related mainly to the transport of supplies and machinery to the works installations, transport of excavation spoil to muck deposition sites, and, to a lesser extent, the transport of personnel to the work sites. For more information on traffic flow increases resulting from the Project, see **Chapter 2, section 2.4.1, part E, Annex 14 of the EIS, and Annexes 9 and 14 of Addendum 1**.

The PHAM highway impact analysis takes into account all works and activities under the Project, including the transport of supplies, machinery, and personnel. According to modeling studies, it is predicted that there will be no significant impact on highway usage (levels of saturation of new and existing roads and intersections). For more information on the Project's road operations, measurements used and models derived, see **Annexes 9 and 15 of the Addendum**. Additionally, increases in noise emissions are analyzed in **Section 6.4.1.2 of the EIS**.

Notwithstanding the above, it is assumed that, given that certain construction activities shall be conducted at the same times that other road users wish to make use of certain sections of specific roads, a certain level of annoyance may be caused, and for this reason the PHAM has adopted a number of control and mitigation measures indicated in **Chapters 6 and 2 of the EIS** and in **Annex 14 of the EIS**, as well as **Annexes 9 and 17 of Addendum 1**.

It is considered likely that, in view of the predominance of the tourist industry in the local economy of the district of the Maipo Valley, a certain level of annoyance may be caused at certain points and at specific moments, mainly due to conflicts between PHAM road usage and the movements of visitors. As indicated in the EIS Baseline Study, this is an area where tourists come to enjoy walks and peace and quiet, on weekends and holidays. In particular, there are 2 specific tourism attractions located in the same areas as site installations: The El Yeso and the Alto Volcán area, where special measures shall be taken, as specified in **Chapter 6 of the Project EIS**.

Additionally, **Annex 32 of the EIS** specifies emergency procedures to be adopted in the event of transport accidents caused by project vehicles.

Remark N° 278**Traffic light timings: how were they obtained?**

At intersections located within the district of La Florida, a response is requested as to how the timings and programming of traffic lights was obtained. The timings used in the models are different to those currently observed at these intersections.

Thematic responses**VIA Roads**

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**.

The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.03 Congestion

When PHAM Project construction activities begin, there will be an increase in road traffic movements in the immediate surroundings of the work area. This vehicle movement will be related mainly to the transport of supplies and machinery to the works installations, transport of excavation spoil to muck deposition sites, and, to a lesser extent, the transport of personnel to the work sites. For more information on traffic flow increases resulting from the Project, see **Chapter 2, section 2.4.1, part E, Annex 14 of the EIS, and Annexes 9 and 14 of Addendum 1**.

The PHAM highway impact analysis takes into account all works and activities under the Project, including the transport of supplies, machinery, and personnel. According to modeling studies, it is predicted that there will be no significant impact on highway usage (levels of saturation of new and existing roads and intersections). For more information on the Project's road operations, measurements used and models derived, see **Annexes 9 and 15 of the Addendum**. Additionally, increases in noise emissions are analyzed in **Section 6.4.1.2 of the EIS**.

Notwithstanding the above, it is assumed that, given that certain construction activities shall be conducted at the same times that other road users wish to make use of certain sections of specific roads, a certain level of annoyance may be caused, and for this reason the PHAM has adopted a number of control and mitigation measures indicated in **Chapters 6 and 2 of the EIS** and in **Annex 14 of the EIS**, as well as **Annexes 9 and 17 of Addendum 1**.

It is considered likely that, in view of the predominance of the tourist industry in the local economy of the district of the Maipo Valley, a certain level of annoyance may be caused at certain points and at specific moments, mainly due to conflicts between PHAM road usage and the movements of visitors. As indicated in the EIS Baseline Study, this is an area where tourists come to enjoy walks and peace and quiet, on weekends and holidays. In particular, there are 2 specific tourism attractions located in the same areas as site installations: The El Yeso and the Alto Volcán area, where special measures shall be taken, as specified in **Chapter 6 of the Project EIS**.

Additionally, **Annex 32 of the EIS** specifies emergency procedures to be adopted in the event of transport accidents caused by project vehicles.

Remark N° 279

Correction of times for temporary project downtime and correction of simulation models and software used

According to information provided in the impact study, highlighting the fact that analysis must be conducted for the project construction phase, when the highest levels of vehicle traffic will be generated through the transport of personnel, materials, machinery, and supplies; analyses of intersections must be prepared for this situation, with temporary downtime included in the models for the construction and not only modeling isolated intersections, when Av. La Florida, a major transport axis, does not function in this way. Analyses of this route should therefore be prepared using a network model, using other software such as TRANSYT. This analysis should be approved by the Traffic Control Operations Unit, in order to suitably classify and identify the mitigation measures that will be necessary at the different intersections analyzed. Therefore, the highway impact study should be reformulated. Additionally, the isolated intersections are not the same as the ones that also appear in Table 4, in Point VII. 3 Impact area of influence. As the measurements have been used for modeling in SIDRA, the analysis is incorrect for five reasons: first, the measurements are not up to date; second, the Av. La Florida route is a network and does not operate as a number of isolated intersections; third, the Transantiago process was launched in the city on February 10, 2007; fourth, as a result of works at Vicuña Mackenna (METRO) and new station openings, traffic demand along the Av. La Florida route has experienced reassignments; and finally, the significant increase in housing density observed in areas along the Av. La Florida route, including gigantic real estate developments such as Hacienda El Peñón and housing lots for sale at Las Vizcachas and the Aguas Andinas area, as well as in settlements in the district of San José de Maipo in the past two years.

Thematic responses

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayas, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions. The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS**.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

VIA.03 Congestion

When PHAM Project construction activities begin, there will be an increase in road traffic movements in the immediate surroundings of the work area. This vehicle movement will be related mainly to the transport of supplies and machinery to the works installations, transport of excavation spoil to muck deposition sites, and, to a lesser extent, the transport of personnel to the work sites. For more information on traffic flow increases resulting from the Project, see **Chapter 2, section 2.4.1, part E, Annex 14 of the EIS, and Annexes 9 and 14 of Addendum 1**.

The PHAM highway impact analysis takes into account all works and activities under the Project, including the transport of supplies, machinery, and personnel. According to modeling studies conducted,

it is predicted that there will be no significant impact on highway usage (levels of saturation

of new and existing roads and intersections). For more information on the Project's road operations, measurements used and models derived, see **Annexes 9 and 15 of the Addendum**. Additionally, increases in noise emissions are analyzed in **Section 6.4.1.2 of the EIS**. Notwithstanding the above, it is assumed that, given that certain construction activities shall be conducted at the same times that other road users wish to make use of certain sections of specific roads, a certain level of annoyance may be caused, and for this reason the PHAM has adopted a number of control and mitigation measures, indicated in **Chapters 6 and 2 of the EIS** and in **Annex 14 of the EIS, as well as Annexes 9 and 17 of Addendum 1**.

It is considered likely that, in view of the predominance of the tourist industry in the local economy of the district of the Maipo Valley, a certain level of annoyance may be caused at certain points and at specific moments, mainly due to conflicts between PHAM road usage and the movements of visitors. As indicated in the EIS Baseline Study, this is an area where tourists come to enjoy walks and peace and quiet, on weekends and holidays. In particular, there are 2 specific tourism attractions located in the same areas as site installations: the El Yeso and the Alto Volcán area, where special measures shall be taken, as specified in **Chapter 6 of the Project EIS**. Additionally, **Annex 32 of the EIS** specifies emergency procedures to be adopted in the event of transport accidents caused by project vehicles.

Remark N° 280

Provide a plan indicating geometric design and management measures of proposals

The EIS indicates that prior to the launch of the construction of the PHAM, the Highways Department will be presented with the plans for turning installations permitting trucks returning from the work sites to the aggregates pit in the La Obra area to make the left turn in a safe and comfortable manner, without altering traffic flow at that point. Does this mean that a left turn only lane will be built? It is also indicated that the design of the junction will be perpendicular to the southern lane of Route G-25, allowing it to face the current access point for entry to the aggregates pit. What regulatory and preventive signage is planned for this area, arriving from the West? A geometric design study should be added now, and not after the facts, regarding safety measures planned for this phase of the project.

Thematic responses

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.01 Regulations

For information on road and transport regulations in force and applicable to the project, see **Chapter 3, point 3.2**, "Specific environmental regulations applicable to the Project", and the EIS.

The Project Owner stipulates that:

- Crossroad and junction signage projects linked to public roads will fully comply with the requirements established by the Highways Department, particularly in relation to intersection regulation, and regulatory, preventive, and informative signage, and geometric aspects, such as turning radius and lane channeling. For more information, see **Annex 14 of the EIS and Section I, Question 38 in the Addendum**.
- With regard to site installation supply lines, in the event that such lines are installed alongside roadways, prior authorization will be obtained from the Highways Department.
- The Project Owner will permanently supervise weight control, in order to ensure compliance with the stipulations made in Ministry Public Works Supreme Decree 158/1980 which establishes gross weight limits for highways, as well as Decree 200, dated July 1993, and Decree 396, dated November 1993, establishing gross weight limits on urban roads. In both cases vehicle weight may not exceed 45 tons.
- In the event that the transport of supplies and equipment for the construction phase, as a result of the size and/or weight of items to be transported, requires loads above and beyond those stipulated in regulations, the corresponding authorization will be requested from the Highways Department and applicable safety measures will be agreed on a case by case basis.
- As indicated in **sections 2.5.3 and 6.4.1.1 of the EIS**, trucks carrying material at all locations apart from work areas, and all trucks on public highways, will be covered with tarpaulins in order to avoid the spillage of material, in compliance with Decree 75 and 1987 of the Ministry of Transporting I communications, which indicates that "loads must be covered with a suitably sized canvas sheet or tarpaulin, such as to avoid the emission particulate matter into the air", as indicated in **section 3.2.1 of the EIS**.
- The Project will comply with the stipulations of Decree 18 2001 and subsequent amendments, prohibiting the movement of cargo vehicles within the Anillo Américo Vespucio ring road.

Within the framework of the SEIA and the environmental requirements and/or conditions imposed by the Authorities at the time of approving the Project, the Project Owner confirms and accepts ultimate responsibility relating to transport and any contingency or accident that may arise and/or cause damage to the environment or third parties and that is linked to works and activities undertaken as part of the PHAM, as required in conformity with legislation in force. This does not affect collective liability and compliance that, regardless of the SEIA, is established under the Civil Code and administrative procedures in this field.

Remark N° 281

Clarification annual employment of personnel and quantity of external persons to work on the Project

With regard to the specific characterization of the qualified and unqualified personnel to be employed on the project, filling a wide range of positions during the construction and operations phases, the Project Owner should indicate how many persons will be employed by the PHAM for each year, in accordance with information provided in Figure 1, Activities during the Project Construction Phase, on page 5 of the Highway Impact Study. In view of this information, a response is required regarding how many persons will be brought in from outside of the population of San José de Maipo.

Thematic responses

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.01.01

Requirements

In view of the characteristics and scale of the Project, personnel with specific qualifications will be required for the operation and maintenance of plant machinery and equipment, during the operations phase. Conversely, during the Project Construction Phase, it is projected that labor requirements will create jobs not only for mining workers, but also for machinery operators, drivers, and both skilled and unskilled construction personnel, the latter working mainly as day laborers and assistants.

The population of the Project's area of direct influence has been found to possess levels of training and specialization (occupation as defined under the CIIU code) that shall permit them to access both skilled and unskilled work positions created by the Project.

SOC.02 Human contingent presence

The presence of Project employees will be temporary (limited both to the years of the construction phase, and to the working day organized into shifts), thus disincentivizing them and their families from moving to the area on a permanent basis. During the Project's construction phase, its employees shall sleep in the encampments described in the documentation, not making use of existing hotels and hostels located in and near the area's settlements.

Once the construction phase has been completed, the Project's installations and encampments shall be removed; they shall therefore not become part of existing settlements, or form new centers for the formation of settlements.

The PHAM plans call for the creation of 5 encampments, located away from settlements. These encampments will be operated as described in Annex 33, and each will house a permanent contingent of 200-400 employees, under the standard working regime adopted by mining installations. The transport of employees from the encampments to their places of residence shall have a frequency determined in accordance with the working shifts. Therefore, it is important to understand that under no circumstances shall the presence of Project employees in the area lead to the type of interaction with The resident community and demand for local services that currently occurs as a result of the flow of tourists and visitors, mainly during weekends, holidays, and the summer season.

In view of the above, the Project shall not lead to the following potential impacts: overpopulation at a local or district level (in existing settlements); or effects modifying local customs, economic service provision activities, connectivity, and local load capacity (understood to refer to the load placed on infrastructure and equipment).

As indicated in Annex 39 of the EIS, documentation supporting the analysis described above shall form part of activities under the Social Indicator Monitoring (SIM) program. This monitoring program is based on compiling information using qualitative and quantitative techniques developed in the field of Social Sciences, oriented towards investigating a suite of indices that pay due heed to trends in relevant variables for monitoring, selected in accordance with the characteristics of the Project and of the communities in the area where it is to be implemented. Reports will be issued twice per year containing the results obtained, including the use of graphical aids to show comparative changes in parameters from one study campaign to the next. This document will be delivered to CONAMA.

In general, by gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project may cause in its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities.

SOC.05 Migration

Job creation during construction, works to improve the quality of

certain roads and to maintain them, and the creation of other more minor roads, will help to encourage traditional families to remain in the area - as they themselves have stated, as most emigration among such groups is linked to lack of employment and the major difficulties imposed by the lack of public transport to some areas, the poor state of roads, and the isolation that they see as plaguing them, as a result of the closure of roads due to inclement weather conditions.

Conversely, the PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Addendum Section VII, Question 19**.

Remark N° 282

What works will be built at the El Manzano Intake?

The PHAM documentation does not include a layout map showing works to be built at the El Manzano intake and channel through to the Maipo River discharge spillway, including all natural watercourses involved. Similarly, no detailed information is included regarding the influence of water intakes on probable reductions in flow rates. Why did the PHAM not consider such factors, when this zone is located within the area of influence?

Thematic responses

Specific response

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in
**Chapter 2 of the
EIS.**

AGU.02.01

Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have

no effect whatsoever on the legitimate rights that various water user communities

hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 283 Explain

What is the reason for not considering mitigation works and their maintenance in areas where nothing currently exists, and where if works are built as a result of necessity imposed by the PHAM, in order to ensure the exercise of irrigation water usage rights held by the El Manzano Channel users? It should be born in mind that there is currently no need to maintain something that does not exist. In the future, if it is necessary for such works to be undertaken, this should be the responsibility of the PHAM and not the El Manzano Channel users. Maintenance should be guaranteed over an area running from the riverbed through to the start of the channel (flow diverter or marker), covering the full watercourse at the levels demanded for full exercise of the rights held, in terms of volume and velocity. What level and what specifics are referred to in the agreement made and explained at the citizen participation meeting held on August 23 in San José de Maipo, shown in the last few slides of the PowerPoint presentation made by GENER?

Thematic responses

Specific response

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in
**Chapter 2 of the
EIS.**

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a

suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate

of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 284

Impact on Wildlife Biodiversity in the Area

The AES Gener project plans for structures, activities, and changes in the environment that will directly and indirectly affect vertebrate and invertebrate species. The AES Gener EIS pays lip service to respecting the law on hunting, but this is not sufficient in terms of respect for the delicate biodiversity of the area affected. The documentation discusses "temporary and indirect" damage, but in my opinion the damage will be direct and permanent.

The EIS recognizes that 86 species of animals are to be found within the area affected, of which 16 are classified as vulnerable, and most exhibit a high level of endemism. In our analysis of this study, it strikes us that first of all, no study of aquatic wildlife has been conducted, with no mention of its existence and importance. Additionally, on analyzing the EIS we have noticed the absence of many species, offering the following list by way of example:

Mammals:

- Puma (*Puma concolor*)
- Lesser Grison (*Galictis cuja*)
- Noé Chinchilla Rat (*Euneomys noei*)
- Elegant Fat-tailed Mouse Opossum (*Thylamys elegans*)
- Long-Tailed Pygmy Rice Rat (*Oligoryzomys longicaudatus*)
- Vizcacha (*Lagidium viscacia*)
- Degu (*Octodon degus*)
- Darwin's Leaf-eared Mouse (*Phyllotis darwini*).
- Long-haired Grass Mouse (*Abrothrix longipilis*)
- Olive Grass Mouse (*Abrothrix olivaceus*)

Birds

- Piuquén
- Band-winged Nightjar (*Caprimulgus longirostris*)
- White Owl (*Tyto alba*)
- Cernícalo (*Falco sparverius*)
- Blanquillo (*Podiceps occipitalis*)
- Jote (*Coragyps atratus*)
- Peregrine Falcon (*Falco peregrinus*)
- Torcaza Patagioenas (*Columba araucana*)
- Dormilona de ceja blanca *Muscisaxicola albilora*
- Dormilona cenicienta *Muscisaxicola cinerea*
- Dormilona fraile *Muscisaxicola flavinucha*
- Dormilona de frente negra *Muscisaxicola frontalis*
- Dormilona tontito *Muscisaxicola malcoviana*
- Dormilona chica *Muscisaxicola maculirostris*
- Dormilona de nuca rojiza *Muscisaxicola rufivertes*

Reptiles

- Chilean Short Tail Snake (*Tachymenis chilensis*) Vulnerable, Endemic
- Chilean Long Tail Snake (*Philodryas chamissonis*), endemic and vulnerable

Many species not mentioned or not detected in the EIS by AES Gener are endemic, of high biological value, endangered, and/or beneficial to humanity. The Puma, the Lesser Grison, the Vizcacha, and the Chinchilla Rat, to name but a few, are listed for conservation as vulnerable species. Over 27 species have been omitted, leading us to question to methodology employed. Survey activities consisted of only 4 days spent in the field, 2 days in spring and 2 days in the fall - which is clearly insufficient, considering that some species are migratory, some are scarce, and others are very difficult to spot and to detect from their tracks and spoor.

Additionally, certain sites located close to the project's planned work areas are key locations for the survival of vulnerable species, such as the Caiquén (*Chloephaga picta*), which is found in the highlands of the Maipo Basin, as the northernmost point of its nesting range. A key aspect in terms of focusing wildlife conservation efforts is to understand the mechanisms that lead populations to diminish and to become extinct - mechanisms that the company has not taken into account. We are surprised at the certainty with which it is stated that the project shall not lead to decline in populations or cause negative effects on biodiversity. Key wildlife species that would be directly affected by the project include:

The Torrent Duck (*Merganetta armata*), an iconic bird of the rivers that flow through the Andean foothills, which lives year-round in the waters of the Maipo River. This is a very little-known but valuable bird, that merits attention and protection. It is a bird that is specialized for river habitats in mountainous Andean areas, being typically found in wide, fast-flowing rivers. The species is not adapted to live in creeks or small streams with lower flow rates, and it does not inhabit stagnant water. Additionally, the survival of the invertebrates on which it feeds is dependent on the flow rate. The future of this species depends on the protection of its habitat, and this project has ignored it. It was in this way that the hydroelectric dam on Chamiza River, in Region X of Chile, affected the local distribution of torrent ducks. Previously the species was seen there, but now it is not. Many of the factors that affect this species also affect the other duck species that inhabit the area.

The Cururo (*Spalacopus cyanus*) is a species of rodent that is endemic to Chile, and its conservation status is listed as endangered. Its behavior includes burrowing and living in complex tunnel systems with galleries, in soil that has plants with edible roots and bulbs growing in it. It is important to point out that this species is able to move through the protected area known as the Cascada de las Ánimas, located within the Sanctuary, which provides care and protection for a large number of individuals confiscated by the SAG. The Nature Sanctuary has been protected in the past by the natural barrier formed by the Maipo River, the fast flowing waters of which have protected the Sanctuary from illegal hunting, uncontrolled habitat damage, and theft of individual animals from the Wildlife Refuge. The theft of wildlife from rescue centers is not a minor issue, and the CODEFF rescue center has suffered losses as a result of such theft. A drop in flow rate will leave the Sanctuary unprotected, leaving its fragile wildlife vulnerable. In conclusion, this is not a feasible project for implementation in an area with such vulnerable, unique, and protected biodiversity as the Cajón del Maipo.

Universidad Andrés Bello

Thematic responses

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neoporteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Lilolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into

neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

F&F.02.02 Mitigation

Aquatic flora and fauna

The Project calls for a suite of multi-purpose environmental management measures that aim to minimize its effects on living organisms, including: minimization of watercourse areas to be subject to intervention by prioritizing such works for late summer and early fall seasons (period of lowest flow rates), the adoption of special precautions to prevent accidental spillages into watercourses (prohibition of the storage of lubricant drums in or near watercourses, etc), and permanent maintenance of ecological flow rates.

For more detailed information, including technical documentation that complements the information described above, see Annex 17 of the Addendum.

Terrestrial Flora and Vegetation

In order to prevent and/or minimize the Project's effects on plant life, it plans to adopt a number of integrative measures: micro-routing in advance of starting work on-site, in order to identify specimens of plants listed in any conservation category and subject to impact; compensation with the planting of 10 specimens for every one destroyed, in the case of non-woodland species listed for conservation; implementation of a woodland management plan applicable to woodland areas, which describes its measures in accordance with Article 5 of the Woodland Law; implementation of vegetation restoration plans at muck disposal sites, encampments, artificial slopes, and tunnel access terraces (EIS, Annexes 7 and 29). More in-depth information on complementary measures is provided in Annex 6 of Addendum 1.

Terrestrial fauna

Specific wildlife environmental management measures have been proposed for each particular species, taking into account prior experience in the success of these measures in similar projects. These measures will be implemented in continual coordination with the Servicio Agrícola y Ganadero. Principal measures include: capture of individuals belonging to species of conservation interest for rescue and relocation; controlled perturbation actions; and habitat replacement. Other measures are based on the use of signage, training for Contractors, and contractual requirements for on-site supervision (see details in Section 6.4.1.6 of the EIS).

See Annex 4 of the Addendum for the native wildlife rescue and relocation plan.

Remark N° 285

Alto Maipo Project Remarks

The Alfalfal II Plant is designed for a flow rate of 27 m³/s, receiving water from the streams located in the upper reaches of the Volcán River and Yeso River basins. In the Upper Volcán River Basin, it will capture a flow rate of 12.8 m³/s, to be added to 15 m³/s from the Yeso River - the latter representing an average annual flow rate (information from the EIS) of only 8.4 m³/s. The same applies to the streams located in the Upper Volcán River Basin, where the Las Placas stream is located, from which plans call for the abstraction of up to 1 m³/s with an average annual flow rate (Q_{ma}) of 0.47 m³/s, the La Engorda with a maximum of 2.1 m³/s and a Q_{ma} of 0.99 m³/s, the Colina Stream, from which a peak flow rate of 6 m³/s will be taken, with a Q_{ma} of just 3.24 m³/s and finally, the El Morado Stream, with a peak flow of 7 m³/s and Q_{ma} of 1.71 m³/s. This calls into question the possibility of generating the required electrical power from this plant and the Las Lajas Plant, which will make use of the same water flow.

The Las Lajas Plant is designed for a peak flow rate of 65 m³/s, receiving its input from the discharge pipes of the Alfalfal and Alfalfal II Plants, as well as additional water from the middle reaches of the Colorado River. These figures suggest that there will be a shortfall in water availability, and a consequent reduction in electrical energy generation.

A number of different methodologies are used to determine the ecological flow rates proposed by the DGA, to wit:

Qeco = 10% of annual average flow rate.

Qeco = 50% of minimum low water flow rate in 95% of years

Qeco = Flow rate that is exceeded on at least 330 days of the year = Q₃₃₀

Qeco = Flow rate that is exceeded on at least 347 days of the year = Q₃₄₇

The DGA is also empowered to reserve ecological flow rates of up to 20% of average annual flow rate, and, in special cases, even up to 40%.

The project documentation mentions that the Colorado River, upstream of its confluence with the Maipo River, has an average annual flow rate of 32.7 m³/s, which the annexes mention a figure of 31 m³/s. The Project establishes an ecological flow rate of 0.6 m³/s, which will be maintained for approximately 7 months of the year. This does not correspond to any of the methodologies listed above.

As stated in the EIS "plans call for a total of 5 encampments, including site installations, each with an approximate workforce of 200 to 400 employees, amounting to a total of 2000 persons on average, with peak hiring standing at 2500". If the workforce housed at each encampment is 200 to 400 persons, it seems difficult to arrive at an average of 2000 employees.

The project includes the extraction of inert material, wet rock and crushed rock extracted from the tunnels, referred to as "Muck". It will be disposed of in muck disposal heaps that are part of the project. The estimated volume mentioned in project documentation is 1.7 million m³, but later in the documentation, in the Muck Management Plan, a figure of 2.75 million m³ is mentioned. Furthermore, no mention is made of any analysis of this material, and its possible subsequent leaching leading to contamination. The monitoring program documentation does not mention the frequency with which potential leaching will be observed, of specific sites where observations and/or testing will be conducted; similarly, it does not mention for how long this monitoring will be conducted. Tests for acidic drainage are mentioned, but once again the frequency of such testing, and the specific sites where it will be conducted, are not mentioned. With regard to industrial waste produced, which the project documentation states will comprise "waste oil and lubricant grease": The reuse and/or sale of this material to third parties will be prioritized, and such substances may be gathered on a temporary basis at specially prepared storage sites, for subsequent removal and disposal at authorized disposal sites, transported there by companies authorized to transport such substances". No mention is made of the characteristics of these temporary storage sites, to prevent spillages and the contamination of soil, surface water, and groundwater.

Project documentation estimates domestic waste production, at peak hiring levels, at a maximum of 2,500 kg per day. It is stated that such waste will be stored in containers and removed on a regular basis by the contractor, for subsequent disposal at an authorized disposal site. No mention is made of the frequency of waste removal, to prevent the buildup of disease vectors and focal points of contamination.

The report makes no mention of special treatment for plant and vegetable waste, for which we propose a waste stabilization treatment using composting, for subsequent use in improving soils affected by the project.

The project documentation mentioned that before starting construction activities, a population and habitat condition study will be conducted for the frog *Alsodes nodosus*; *Spalacopus cyanus* (cururo) and for *Merganetta armata* (torrent duck). Additionally, it would be advisable to include the following amphibian species that are suffering from conservation problems: *Telmatobius leavis* and *Bufo espinulosus*. The district is also home to endemic reptiles that are suffering from conservation problems and that exist in areas where the project will be implemented, such as *Pristidactylus volcanensis* and *Liolaemus gravenhorsti*.

The Vegetation Restoration Plan, in the annexes, mentions that "the localization of sites for vegetation restoration measures will be determined by the specialist, ruling out areas where natural restrictions lead to little or no plant cover, and where existing soil conditions are unsuitable for the desired level of plant take-up." At the very least, the restoration of pre-existing vegetation in these areas should be ensured, with soil improvement conducted if necessary.

The Vegetation Management Plan establishes reforestation actions in areas with different uses, using exotic species such as eucalyptus and European Peumo, creating a negative environmental and landscape impact.

Benjamín Astorga Leiva

Cascada de las Ánimas

Thematic Responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of

them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3**, and **Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neopteris curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo Spinolosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Liolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopietes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

F&F.02.02 Form of mitigation

Aquatic flora and fauna

The Project calls for a suite of multi-purpose environmental management measures that aim to minimize its effects on living organisms, including: minimization of watercourse areas to be subject to intervention by prioritizing such works for late summer and early fall seasons (period of lowest flow rates), the adoption of special precautions to prevent accidental spillages into watercourses (prohibition of the storage of lubricant drums in or near watercourses, etc), and permanent maintenance of ecological flow rates.

For more detailed information, including technical documentation that complements the information described above, see Annex 17 of the Addendum.

Terrestrial Flora and Vegetation

In order to prevent and/or minimize the Project's effects on plant life, it plans to adopt a number of integrative measures: micro-routing in advance of starting work on-site, in order to identify specimens of plants listed in any conservation category and subject to impact; compensation with the planting of 10 specimens for every one destroyed, in the case of non-woodland species listed for conservation; implementation of a woodland management plan applicable to woodland areas, which describes its measures in accordance with Article 5 of the Woodland Law; implementation of vegetation restoration plans at muck disposal sites, encampments, artificial slopes, and tunnel access terraces (EIS, Annexes 7 and 29). More in-depth information on complementary measures is provided in Annex 6 of Addendum 1.

Terrestrial fauna

Specific wildlife environmental management measures have been proposed for each particular species, taking into account prior experience in the success of these measures in similar projects. These measures will be implemented in continual coordination with the Servicio Agrícola y Ganadero. Principal measures include: capture of individuals belonging to species of conservation interest for rescue and relocation; controlled perturbation actions; and habitat replacement. Other measures are based on the use of signage, training for Contractors, and contractual requirements for on-site supervision (see details in Section 6.4.1.6 of the EIS). See Annex 4 of the Addendum for the native wildlife rescue and relocation plan.

MAR Muck

The PHAM plans to construct approximately 70 km of tunnels. The excavation of these tunnels will generate inert material consisting of wet rock and crushed rock, known as muck, as well as

smaller quantities of inert material produced in road building and the construction of buried conduits.

This muck material will be deposited in the 14 muck disposal heaps that the Project plans to create. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria. For more information, please see **Annex 6 of the EIS** and **Annex 3 of the Addendum**.

MAR.01 Regulations

The Project Owner has made available a Management Plan for "Project Muck Disposal Heaps", which contains information on the technical, environmental, and safety specifications of the heaps, as well as recommendations

contained in the Ministry of Public Works' 2004 Environmental Management Plan Manual for Works Subject to Concessions. In particular, the Plan establishes the environmental considerations adopted for the operation of the muck disposal heaps, to be implemented during the construction of tunnels and roads under the PHAM.

In order to comply with the environmental management measures contained in the EIS, an Environmental Monitoring Program will be conducted, with the aim of verifying the effectiveness of these measures and compliance with them. For details on the principal actions included in the Monitoring Program, and for the various stages of functionality of the muck disposal sites, see

Annex 6 of the EIS and **Annex 3 of Addendum 1**.

For more information on the specific regulations applicable to the Project, and compliance therewith, see **Chapter 3 of the EIS**.

MAR.02 Location

The PHAM calls for the creation of 14 muck disposal heaps, for the disposal of waste material from tunnel boring and smaller quantities of inert waste from the construction of roads and buried conduits. Maps of the muck disposal heaps, and a copy of the muck disposal heap management plan, are included in Annex 6 of the Project EIS. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria.

From a technical and safety perspective, the muck disposal heap sites have been located as close as possible to exit points from tunnels and to surface work sites, in areas not at risk to landslides or landslip events.

The following aspects have been taken into account as environmental criteria in site selection: Sites have been selected that are distant from any settlements or any housing used on a permanent or temporary basis.

Priority has been given to selecting sites with low visual impact - that is, in areas that are distant from potential observation points on public highways or high ground.

In the Project area's higher elevation regions, the disposal heaps have been sited up against natural topological features, such that the emplacement of the heaps' layers forms a continuation of the general landform structures of the area.

In general these are areas that are of low value as a habitat for plant life (soils with usage capacity ratings V, VI, and VII), and efforts have been made to avoid modifications to the original land form structures present or to surface watercourses.

Surface surveys have been conducted in all of these regions, as details in **Section 5.8, in Chapter 5 of the EIS**, to rule out the presence of sites of archeological and/or paleontological value at the muck disposal heap sites.

For more information, see **Annex 6 of the EIS** and **Annex 3 of Addendum 1**.

MAR.03 Characteristics

The material to be deposited in the muck disposal heaps will be inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of waste material produced in road building and the construction of buried conduits. It is expected that a total of 1.7 m cubic meters of TBM muck will be produced.

The total volume of material to be disposed of is estimated at 2.7 m cubic meters, including uncompacted rock and soil; this material will be disposed of at the 14 muck disposal heap sites planned under the PHAM. Maps of the muck disposal heaps,

and a copy of the muck disposal heap management plan, are included in Annex 6 of the EIS.

The waste material produced through tunnel excavation, road building, and construction of buried conduits during the construction phase will be deposited in a series of layers forming terraces. The muck disposal heaps will be built up in an organized manner, forming level and safe platforms, with slopes at the sides with the natural gradient formed by the material in question, thus ensuring stability and permitting adequate drainage. All of these design features are in conformity with the muck disposal heap construction method and environmental measures indicated in **Section 4.2 of Annex 6 of the EIS, and Annex 3 of Addendum 1**.

Finally, the filling will be covered with 20 cm of organic soil, permitting the definitive finishing of the spoil heap.

Management and restoration techniques for the 14 muck disposal heaps are indicated in Annex 29, "Restoration Plan", which includes information on surface treatments.

MAR.04 Impact

All of the measures adopted for the creation, operation, and abandonment of the muck disposal heaps will be implemented by the Works Contractor. Gener will undertake an environmental monitoring plan addressing the management and usage of the sites, which will include site inspections and periodic review of site entry records.

Rainwater will be managed using specially designed channeling works, the details of each of which are indicated in the plans attached in Annex 6 of the EIS.

The Project Owner's reiterates its commitment to undertake an exhaustive program to rescue low mobility fauna in the area of direct influence of PHAM works (including the area to be occupied by the 14 sites where muck, spoil, and earth will be disposed of in heaps). This wildlife rescue will require the application of capture techniques suitable for small mammals, reptiles, and amphibians. **Annex 4 of Addendum 1** presents the Wildlife Rescue and Relocation Plan.

Even following surveys ruling out the presence of archeological or paleontological sites or finds in the muck disposal heap sites, the PHAM also includes a series of measures designed to prevent any intervention in sites with heritage value, with the implementation of restricted areas and training programs for contractor personnel. For more information, see **Annex 14 of Addendum 1 and Annex 33 of the EIS, "Restricted areas"**.

The Project Owner indicates that most waste generated will be produced during the Project's construction phase. Two types of waste will be produced:

- **Solid waste:**
Construction waste such as wood, piping offcuts, rubble, wires, waste packaging, metals, etc.
Domestic waste or waste similar to domestic waste; plant waste such as remains of shrubs, weeds, and smaller quantities of tree waste removed from work sites.
- **Liquid waste:**
Applicable to the following activities: concrete production, washing and preparation of aggregates, and washing of truck chassis and load beds, machinery, and tools. Other liquid waste relates to wastewater from bathrooms, showers, canteens, and other activities conducted within encampments and site installations.

Gener will place strict contractual requirements on Contractors during the construction phase, aiming to ensure suitable management and final disposal of waste. Additionally, contractors and subcontractors shall agree to comply with regulations and oversight actions established by Law, to be applied to all works of this nature. The planned environmental management manual will prevent the occurrence of any pollution events linked to the Project (**see EIS, Annex 18**).

RES.01 Regulations and Responsibilities

In order to ensure the efficient, safe, and responsible treatment and management of waste matter generated by the PHAM an additional plan has been developed, the "Waste Management Plan for Work Sites, Works Installations, and Encampments", describing the procedures and equipment necessary for the management and disposal of waste produced during the construction of the Project, and which also specifies the responsibilities required under its implementation, what records must be kept, and what reports must be prepared for the purposes of control and oversight (Annex 18 of the EIS).

Gener will enforce implementation and compliance with the Project's environmental measures during construction management, placing strict contractual requirements on Contractors with the aim of ensuring suitable management and final disposal of waste. **RES.02 Location**

a) Handling of solid waste

Infrastructure for the integrated management of solid waste throughout the life of the Project, addressing the full gamut of temporary storage, preparation, and classification for transport, will comprise: waste collection and storage sites at the point where it is generated; areas for non-hazardous waste; and an area for hazardous waste. These waste storage areas, for non-hazardous and hazardous waste, will be located as shown in tables 5.1.1 (pages 7 and 8) and 5.3.1 (pages 11 and 12) in Annex 18 of the EIS, respectively.

Domestic waste and organic waste similar to domestic waste will be disposed of in a sanitary landfill site, while construction waste other than rubble and domestic waste or organic waste similar to domestic waste will be sent to the waste management area for classification, where materials with potential residual value will be returned for reuse or recycling, and the remainder will be dispatched to a sanitary landfill site (Annex 18 of the EIS, page 6).

b) Handling of liquid waste

• **Wastewater**

Wastewater produced in encampments will be subject to primary and secondary treatment, provided by installing modular activated sludge treatment plants at each encampment. These systems are based on unitary operations, with units designed and equipped to treat wastewater input such as to attain a level of purity sufficient for discharge or reuse with no associated risks to persons or to the environment, in full compliance with the regulations stipulated in Supreme Decree 1-90.

Wastewater generated at work areas, through the use of chemical bathrooms, will be transported to by the contractor in wastewater transport trucks to authorized sites for subsequent treatment.

Sludge generated through wastewater treatment will be removed by the works contractor for transport and disposal at authorized sites on a weekly basis. The sludge will be removed in wastewater transport trucks, and in accordance with the volume of sludge produced it is expected that each encampment will require 2 to 3 journeys by 6 m³ capacity wastewater transport trucks per week, throughout the construction phase. Meanwhile, during the operations phase, the project will use the existing installations at the existing Alfalfa Plant Control Room, with no requirement to install a new wastewater treatment system, and thus not producing the sludge that such a system would generate.

For more information, see **Annex 18 of the EIS**.

• **Liquid industrial waste**

In view of the characteristics of this type of wastewater, the project plans to install a sequential sedimentation system. In view of this situation, a settling pond will be installed at each work site to permit the separation of liquid industrial waste into clear water and settleable sludge.

(see **Annex 5 of Addendum 1**)

RES.03 Characteristics

The types of waste to be produced during the construction phase, and the characteristics thereof, are as follows:

Characteristics of solid waste

Solid non-hazardous waste

This class of waste includes:

- Construction waste: consisting of wood, piping offcuts, rubble, wires, waste packaging, metals, empty cans and drums used to transport paint and adhesives, and other similar items.
- Domestic waste and other waste similar to domestic waste: basically includes leftover food from canteens, packaging, paper, card, and similar materials.

- Plant waste: consisting of remains of shrubs, weeds, and smaller quantities of tree waste removed from work sites.

Hazardous solid waste

Types of hazardous waste produced by the Project correspond to waste generated

in workshops, storage areas, and work sites, such as:

- Solvents
- Oil waste
- Lubricating grease
- Batteries
- Oil filters

Characteristics of liquid waste

Wastewater

This class of liquid waste relates to wastewater from bathrooms, showers, canteens, and other activities conducted within encampments, site installations, and work sites. This wastewater will be subject to primary and secondary treatment, provided by installing modular activated sludge wastewater treatment plants at each encampment.

Liquid industrial waste

Liquid industrial waste shall be generated only through the following activities: concrete production, washing and preparation of aggregates, and washing of truck chassis and load beds, machinery, and tools.

As a result of this fact, this type of liquid waste shall be generated only at work sites.

Meanwhile, wastewater shall not be produced at the Project's encampments, as these areas shall be used only for personnel lodgings.

For more information, see **Annex 18 of the EIS**.

RES.04 Impact

Gener considers the suitable handling of waste produced by the Project to be of particular importance, and to this end it has designed rigorous programs for the handling, collection and storage, transport, and final disposal, reuse or sale of the different forms of waste that shall be generated at the Project's encampments and site installations, as well as its work sites. These programs have been designed specifically taking into account the particular features of the area where the Project is to be implemented, as well as regulations in force and the requirements imposed by the authorities during the Project's environmental evaluation. In general this category includes non-hazardous waste produced during construction activities and from domestic sources (the latter at workers' encampments), and production of this waste will cease at the end of the construction phase:

- Liquid waste will be reused or disposed of in compliance with applicable sector regulations. All discharge of treated wastewater will be conducted at isolated points, generally without the presence of other human use and with low physical and visual accessibility.
- For both hazardous and non-hazardous waste, the Project Owner plans to transport material for disposal in authorized sites, eliminating the possibility of creating centers of soil or water contamination that might have a negative effect on the quality of the area's scenery. The storage areas, rubble, and other materials stored on a temporary basis within site installations shall be removed once construction activities have been completed, and therefore shall have no impact on the landscape.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.02 Human contingent presence

The presence of Project employees will be temporary (limited both to the years of the construction phase, and to the working day organized into shifts), thus disincentivizing them and their families from moving to the area on a permanent basis. During the Project's construction phase, its employees shall sleep in the encampments described in the documentation, not making use of existing hotels and hostels located in and near the area's settlements.

Once the construction phase has been completed, the Project's installations and encampments shall be removed; they shall therefore not become part of existing settlements, or form new centers for the formation of settlements.

The PHAM plans call for the creation of 5 encampments, located away from settlements.

These encampments will be operated as described in Annex 33, and each will house a permanent contingent of 200-400 employees, under the standard working regime adopted by mining installations. The transport of employees from the encampments to their places of residence shall have a frequency determined in accordance with the working shifts.

Therefore, it is important to

understand that under no circumstances shall the presence of Project employees in the area lead to the type of interaction with the resident community and demand for local services that currently occurs as a result of the flow of tourists and visitors, mainly during weekends, holidays, and the summer season.

In view of the above, the Project shall not lead to the following potential impacts:

overpopulation at a local or district level (in existing settlements); or effects modifying local customs, economic service provision activities, connectivity, and local load capacity (understood to refer to the load placed on infrastructure and equipment).

As indicated in Annex 39 of the EIS, documentation supporting the analysis described above shall form part of activities under the Social Indicator Monitoring (SIM) program. This monitoring program is based on compiling information using qualitative and quantitative techniques developed in the field of Social Sciences, oriented towards investigating a suite of indices that pay due heed to trends in relevant variables for monitoring, selected

in accordance with the characteristics of the Project and of the communities in the area where it is to be implemented.

Remark N° 287
Alto Maipo Hydroelectric Project

The project is unacceptable from the perspective of the usage of water owned by residents of the area for the benefit of the hydroelectricity company.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS**.

This section presents information characterizing the basins and tributaries of the Volcán, Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex

13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS**.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this

research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfafal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly

frequented, minimizing their visual impact.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. In parallel,

the study investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 288 Environmental Impact

I believe that the beautiful surroundings of the Cajón del Maipo, which has been declared a "Natural Reserve of International Interest", would lose their attractiveness for tourism - and the Law on Free Commerce and the Protection of the Andes.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents. TUR Tourism Scenery**

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 289 Financial Interests

The PHAM will make use of the existing Alfalfal installations for its hydroelectric plant solely to turn a profit, without a care for environmental harm to the Cajón del Maipo.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water,

which will pass through the turbines and then be returned to the river. This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly

frequented, minimizing their visual impact.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

Remark N° 290 Water Usage

This will affect the entire valley, as it will affect all plant and animal life and all those who love nature.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

ivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

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F&F Biodiversity Impact Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempeo Stream, and

the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neopterteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo Spinolosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Liolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

F&F.02.02 Form of mitigation

Aquatic flora and fauna

The Project calls for a suite of multi-purpose environmental management measures that aim to minimize its effects on living organisms, including: minimization of watercourse areas to be subject to intervention by prioritizing such works for late summer and early fall seasons (period of lowest flow rates), the adoption of special precautions to prevent accidental spillages into watercourses (prohibition of the storage of lubricant drums in or near watercourses, etc), and permanent maintenance of ecological flow rates.

For more detailed information, including technical documentation that complements the information described above, see Annex 17 of the Addendum.

Terrestrial Flora and Vegetation

In order to prevent and/or minimize the Project's effects on plant life, it plans to adopt a number of integrative measures: micro-routing in advance of starting work on-site, in order to identify specimens of plants listed in any conservation category and subject to impact; compensation with the planting of 10 specimens for every one destroyed, in the case of non-woodland species listed for conservation; implementation of a woodland management plan applicable to woodland areas, which describes its measures in accordance with Article 5 of the Woodland Law; implementation of vegetation restoration plans at muck disposal sites, encampments, artificial slopes, and tunnel access terraces (EIS, Annexes 7 and 29). More in-depth information on complementary measures is provided in Annex 6 of Addendum 1.

Terrestrial fauna

Specific wildlife environmental management measures have been proposed for each particular species, taking into account prior experience in the success of these measures in similar projects. These measures will be implemented in continual coordination with the Servicio Agrícola y Ganadero. Principal measures include: capture of individuals belonging to species of conservation interest for rescue and relocation; controlled perturbation actions; and habitat replacement.

Other measures are based on the use of signage, training for Contractors, and contractual requirements for on-site supervision (see details in Section 6.4.1.6 of the EIS).

See Annex 4 of the Addendum for the native wildlife rescue and relocation plan.

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

SUE.02 Soils, meadows, and wetlands

The Project Owner has conducted a number of studies with the aim of characterizing the vegetation of summer grazing areas (La Engorda) (see details in Addendum 1, Annex 6, and in Chapter 5 of the EIS), as well as flora and vegetation studies in the Project's area of influence (EIS, Chapter 5).

These studies contain information compiled in fieldwork campaigns conducted in Fall 2005, Spring 2006, November 2007, March 15 and 16, 2008, and September 2008, which add to the body of knowledge available regarding vegetation in these areas.

The Lo Encañado area shall be assigned a status of controlled access area for works contractors at all times: it shall not be subject to any intervention whatsoever. For more information on vegetation areas that could be affected by the construction works, and to learn about mitigation measures proposed by the Project Owner, you are advised to review Annex 42 of the EIS and Annex 6 of the Addendum.

With regard to environmental regulations that apply specifically to vegetation and plant life, the Project Owner shall be subject to: **Supreme Decree 366** (Exploitation of Tamarugo, Carob, Chañar, Guayacán, Aextoxicon, Charcoal, Acacia, Boldo, Maiten, Litre, Bollen, and Quillay). This legal instrument governs the felling of trees and bushes.

Supreme Decree 4363 and D.L 701 (Approving the Definitive Text of the Law on Woodland and Regulations on Forest Promotion).

Article 2 of the Woodland Law establishes an obligation that land classified as for preferential woodland land use, as well as natural and artificial woodlands, are subject to woodland management plans approved by the National Forestry Commission (CONAF). Furthermore, Article 21 of Decree Law 701 establishes that any felling or usage of native woodland shall be subject to the CONAF's prior approval of the corresponding management plan.

Decree 82 (Prohibiting the Felling of Trees and Bushes in Indicated Andean High Mountain and Foothill Areas)

Article 102 Sector Environmental Permit (Permit for the felling or exploitation of native woodland, in any type of land, or plantations located in land with preferential characteristics for woodland use).

For further information and analysis on the aforementioned regulations and permits, as applicable to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see Sections 3.2.6 and 3.3.7 in Chapter 3 of the EIS.

Remark N° 291
Government

It is the duty of the government to protect natural resources, and not allow environmental conditions to be altered irreversibly.

Thematic responses

OTR Other

This section relates to certain special situations that could not be categorized, or that are linked to specific requests, disqualifications, or situations that feature a clear political component, against either the environmental authority or the Project Owner.

OTR.02 CONAMA

Remark N° 299

Impact on Production Activities: Tourism

What plans exist for the mitigation of the impact that the project shall cause for tourists during the operations phase, through increases in journey times or increased waiting periods at intersections? The project owner should calculate the percentage of Santiago residents who regularly visit the Maipo Valley and who shall stop visiting as a result of annoyances caused by the project.

How will people who are in the business of working for tourists and selling them things make a living? Why doesn't AES Gener hire them to feed their personnel with local baked goods?

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term

mutually beneficial relationships between the project and its surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **SOC Socio-Economic Impact**

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. In parallel, the study investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal

operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives

coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayas, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions. The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS**.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

VIA.03 Congestion

When PHAM Project construction activities begin, there will be an increase in road traffic movements in the immediate surroundings of the work area. This vehicle movement will be related mainly to the transport of supplies and machinery to the works installations, transport of excavation spoil to muck deposition sites, and, to a lesser extent, the transport of personnel to the work sites. For more information on traffic flow increases resulting from the Project, see **Chapter 2, section 2.4.1, part E, Annex 14 of the EIS, and Annexes 9 and 14 of Addendum 1**.

The PHAM highway impact analysis takes into account all works and activities under the Project, including the transport of supplies, machinery, and personnel. According to modeling studies conducted,

it is predicted that there will be no significant impact on highway usage (levels of saturation of new and existing roads and intersections). For more information on the Project's road operations, measurements used and models derived, see **Annexes 9 and 15 of the Addendum**.

Additionally, increases in noise emissions are analyzed in **Section 6.4.1.2 of the EIS**.

Notwithstanding the above, it is assumed that, given that certain construction activities shall be conducted at the same times that other road users wish to make use of certain sections of specific roads, a certain level of annoyance may be caused, and for this reason the PHAM has adopted a number of control and mitigation measures, indicated in **Chapters 6 and 2 of the EIS** and in **Annex 14 of the EIS, as well as Annexes 9 and 17 of Addendum 1**.

It is considered likely that, in view of the predominance of the tourist industry in the local economy of the district of the Maipo Valley, a certain level of annoyance may be caused at certain points and at specific moments, mainly due to conflicts between PHAM road usage and the movements of visitors. As indicated in the EIS Baseline Study, this is an area where tourists come to enjoy walks and peace and quiet, on weekends and holidays. In particular, there are 2 specific tourism attractions located in the same areas as site installations: the El Yeso and the Alto Volcán area, where special measures shall be taken, as specified in **Chapter 6 of the Project EIS**. Additionally, **Annex 32 of the EIS** specifies emergency procedures to be adopted in the event of transport accidents caused by project vehicles.

Remark N° 300 Locally Held Water Rights

The Project Owner should demonstrate that it holds the water rights necessary to run the project during all phases, thus ensuring that it will not affect water rights held by third parties.

The Project Owner should clarify whether the surface water flow in the El Manzano Stream will be affected. The settlement of El Manzano does not have a regular supply of drinking water, and residents are often forced to use irrigation water instead. If the flow rate in the El Manzano Stream is reduced, it will become more difficult to capture water to supply to irrigation users.

The Project Owner should clarify whether the flow rate in the Maurino Channel will be affected, and how this will affect irrigation users.

These watercourses should be incorporated into the plan for mitigation, restoration, and/or compensation measures.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see **Table 2.3.4 in Chapter 2 of the EIS.**

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that is, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.04 Monitoring and control of flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but

also biological information necessary to

preserve the aquatic organisms associated with the watercourses. Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán	Stream gauge station	
	406,157	6,259,100	
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

PRO.01.01 Compensation

The concept of compensation refers to the act of indemnifying damages or harm caused. Within the framework of the EIS, the Project Owner has issued a proposal to the competent authority regarding a suite of environmental management measures aiming to minimize, compensate, and restore the Project's impacts, making their implementation sustainable (Chapter 6 of the EIS).

In this regard, compensation is understood to be included in the spirit or end goal of the environmental management measures proposed by the Project Owner, following the evaluation of the direct and indirect effects of the PHAM on each of the environmental components stipulated in Supreme Decree 95, SEIA Regulations.

Remark N° 301 Residents at Work Sites

The Project Owner should specify the exact locations of the work sites. The Project Owner possesses land in El Manzano, as well as a road to the mountains. It should clarify what use it intends to put these holdings to during the project's construction and operations phases.

Will the Project Owner install a work site in the settlement of El Manzano? Will it increase vehicular traffic in the area?

Thematic responses

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

PRO.03.03 Encampments and works installations

For details on the creation of encampments and works installations, please see Chapter 2, Section 2.3.2.4 in the EIS.

For information on PHAM encampment and work site approach routes, see EIS, Chapter 2, Table 2.1.2,

For information on regulations, see Chapter 3 of the EIS and Annex 33, General Operating Regulations for Encampments and Work Sites.

For information on the management of waste produced at work sites and encampments, see Annex 18 of the EIS, "Site Installation Waste Management Plan".

For information on the discharge of treated wastewater, see Response 26 in the Addendum.

For information on human consumption of water at encampments and works installations, see Chapter 2, Section 2.3.2.4, parts b and i.

For an assessments of the impact of the creation of encampments and works installations, monitoring methods, and conditions, see Chapter 6 of the EIS.

RSG Risk

The Project Owner possesses a general risk prevention strategy that imposes certain measures on the Project during its different stages of advance. This strategy features the following components:

- a) Measures incorporated into the Project's engineering design.
- b) Systematic verification of compliance with applicable regulations
- c) Establishment of restricted areas
 - c.1) Area restricted due to their archeological, paleontological, or heritage value
 - c.2) Area of natural value that requires protection by the Project
 - c.3) Officially protected area.
- d) Expert supervision during construction
- e) Training regarding environmentally sensitive issues
- f) Internal risk management and accident prevention programs
- g) Separation of works installations and encampments

For further information on each of these points, please see **Chapter 7 of the EIS**, which specifies the **Environmental Management Plan**, the **Risk Control and Prevention Plan** designed for the Project, the safety measures to be adopted in light of the risks identified, and, finally, the **Accident control plan**, to be activated in the event of the failure of the preventive measures taken by the Project Owner. Furthermore, **Annex 32 of the EIS** presents the **Risk and Contingency Prevention Plan** for contractors.

RSG.03 Blasting

Excavation methods using explosives will be used for the excavation of a proportion of the tunnels involved in the Project. Other tunnels will be excavated using a Tunnel Boring Machine, as described in **Section 2.3.2.2 the EIS**. The surface points where blasting will lead to perceptible

effects are
located close to the entrances of the tunnels that are to be constructed using the

traditional drill and blast excavation technique (**Section 6.4.1.2 and Section 6.4.1.3 of the EIS, and Section 6, Question 26 in the Addendum**). At surface locations in areas where tunnels are to be excavated using the traditional method, no vibrations will be caused that could lead to risks of landslides, rock falls, and landslips resulting from the construction of the tunnels, because these excavation techniques will be used at a great depth below the surface. Noise from blasting will only be audible during the opening of the ends of the tunnels. Once inside the tunnels, excavation works (including detonations) will not be audible, and therefore will not constitute a significant source of noise, and audible blasting will therefore only occur while the ends of the tunnels are being excavated. It is estimated that there will be 2 or 3 detonations per day at each work site. Based on these levels, added to the background noise in each area, it was determined that noise will not rise above the maximum levels permitted under MINSEGPRES Supreme Decree 146/97. For more information on this topic, see **Section 6.4.1.2 of the EIS and Section 8.2.2 of the EIS**, which describe the noise and vibration monitoring program associated with the blasting activities, as established in **Section 6, Question 41 of the Addendum**.

It is important to point out that a controlled intervention will be completed in advance of blasting, consisting of the installation of work platforms, through the removal of vegetation and the rescue of individual plants and/or animals of conservation interest that present low mobility, limited populations, and endemism, and other characteristics of the project and the range of the species in question (see Annex 4 of the Addendum), in particular through the implementation of the "Wildlife Rescue and Relocation Plan".

Regarding the construction of the El Volcán Tunnel, located beneath the El Morado Monument, the depth of the tunnel will vary between 550 m and over 1500 m. No impacts are expected relating to vibrations reaching the El Morado Glacier. For more information, see **Addendum 1, Section 6, Response 13 and Section 1, responses 4, 5 and 6**.

With regard to safety measures planned applying to the handling and storage of explosives, specified in Annex 32 of the EIS, regulatory stipulations for risk prevention and emergency control are provided that will apply to all contracting of works and/or services by Gener, in compliance with the requirements set forth in Law 16,744, Article 66 part 2. See also **Addendum 1, Section 1, Question 35**.

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayas, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions. The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS**.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

VIA.03 Congestion

When PHAM Project construction activities begin, there will be an increase in road traffic movements in the immediate surroundings of the work area. This vehicle movement will be related mainly to the transport of supplies and machinery to the works installations, transport of excavation spoil to muck deposition sites, and, to a lesser extent, the transport of personnel to the work sites. For more information on traffic flow increases resulting from the Project, see **Chapter 2, section 2.4.1, part E, Annex 14 of the EIS, and Annexes 9 and 14**

of Addendum 1.

The PHAM highway impact analysis takes into account all works and activities under the Project, including the transport of supplies, machinery, and personnel. According to modeling studies, it is predicted that there will be no significant impact on highway usage (levels of saturation of new and existing roads and intersections). For more information on the Project's road operations, measurements used and models derived, see **Annexes 9 and 15 of the Addendum**.

Additionally, increases in noise emissions are analyzed in **Section 6.4.1.2 of the EIS**.

Notwithstanding the above, it is assumed that, given that certain construction activities shall be conducted at the same times that other road users wish to make use of certain sections of specific roads, a certain level of annoyance may be caused, and for this reason the PHAM has adopted a number of control and mitigation measures,

indicated in **Chapters 6 and 2 of the EIS** and in **Annex 14 of the EIS, as well as Annexes 9 and 17 of Addendum 1**.

It is considered likely that, in view of the predominance of the tourist industry in the local economy of the district of the Maipo Valley, a certain level of annoyance may be caused at certain points and at specific moments, mainly due to conflicts between PHAM road usage and the movements of visitors. As indicated in the EIS Baseline Study, this is an area where tourists come to enjoy walks and peace and quiet, on weekends and holidays. In particular, there are 2 specific tourism attractions located in the same areas as site installations: the El Yeso and the Alto Volcán area, where special measures shall be taken, as specified in **Chapter 6 of the Project EIS**.

Additionally, **Annex 32 of the EIS** specifies emergency procedures to be adopted in the event of transport accidents caused by project vehicles.

Remark N° 302
Cultural, Paleontological, and Natural Heritage - Baseline
A)

In point V.6 in the EIS, regarding cultural heritage, the existence of heritage resources within the Project's area of influence is recognized, stating that "three areas are identified as featuring resources of cultural interest: Las Morrenas and Camino del Inka in the Lo Encañado Lake area, and the site known as Aucayes I in the Colorado River - Aucayes Stream area (...). In the Alto Volcán area, sites have been detected that may contain very ancient fossils or paleontological material(.....). The PHAM works shall cause no direct intervention".

Further on in the document, in Table 7 (Identification, prediction, and evaluation of environmental impacts and risk situations) it is recognized that the Project shall have a LOW-SIGNIFICANCE NEGATIVE IMPACT on these resources. It should be pointed out that the impact on heritage resources is NEGATIVE AND IRREVERSIBLE (implying their destruction) and therefore cannot be considered to be of low significance.

Furthermore, in TABLE 6, it is stated the Project SHALL NOT AFFECT CULTURAL HERITAGE SITES IDENTIFIED IN THE BASELINE.

Please clarify the contradictions between information provided by the Project Owner in the baseline and in tables 6 and 7: Will the Project have an impact on the area's 3 sites of archeological and paleontological resources, or will it not?.

Thematic responses

**ARQ Archeological and
Paleontological Sites:
Heritage**

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

**ARQ.01
Regulations**

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum. 1.**

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material**

- b) **creation of a viewpoint**
- c) **Fossil trail**

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

ARQ.03 Scientific research

The scientific and cultural importance of the paleontological resources present has been recognized by the PHAM Project Owner, leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the Project Owner has taken on a commitment to enhance knowledge of the area before starting planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may be detected during the course of construction under the PHAM. These activities will contribute not only to the maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of materials or components present.

For more information, see **Annex 14 of Addendum 1**.

Remark N° 303
Cultural, Paleontological, and Natural
Heritage:
Baseline
B)

Please indicate why no information was provided on the Inca site at Laguna del Indio. This site is located mere meters from the Inca trail located 1.5 km from the Project, and consists of a collection of structures in a natural depression, immediately to the W of the Laguna del Indio (Yeso River). The site contains four main enclosures, separated by a central passageway, with each enclosure subdivided into smaller rooms. Several of these rooms show clear evidence of looting. (UTM 396,500 E 6,274,479 N) Elevation 2692 m. The site features a number of architectural features typical of Inka architecture (Late period, c. 1470 to 1535 CE). The site features typical construction techniques, with double walls filled in with small stones. The central passage features a precise E-W orientation, and the layout divides the site perfectly into four parts. The site is associated with the Inka Trail known as the Camino del Inka (see the publication Nuevos Registros de Asentamiento Inca en la cordillera andina de Chile Central. Luis E. Cornejo B., Miguel A. Saavedra V. and Héctor Vera C. 2006).

Please clarify why no reference is made to the existence of published sites located near to the Project.

Thematic responses

ARQ Archeological and
Paleontological Sites:
Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

ARQ.01
Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum 1**.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material
- b) creation of a viewpoint
- c) fossil trail

For more information and details on the preservation of heritage value and

paleontological resources, please see **Annex 14 of Addendum 1**.

ARQ.03 Scientific research

The scientific and cultural importance of the paleontological resources present has been recognized by the PHAM Project Owner, leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the Project Owner has taken on a commitment to enhance knowledge of the area before starting planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may be detected during the course of construction under the PHAM. These activities will contribute not only to the maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of materials or components present.

For more information, see **Annex 14 of Addendum 1**.

Remark N° 304
Cultural, Paleontological, and Natural
Heritage
Chapter 8. Environmental Monitoring Plan

Chapter 8 contains the Environmental Monitoring Plan, which will allow the monitoring of relevant environmental variables that have given rise to the content of the EIS. Here, the Project Owner states that "The PHAM hereby submits to the SEIA that during execution of the Project certain effects, characteristics, or circumstances referred to in subsections b), d), e), and f) of Article 11 of Law 19,300 may arise or be caused, and that therefore the implementation of the Project shall include a suite of mitigation, compensation, or restoration measures that are suitable for offsetting these effects". Part f) of that Article refers to "alteration of monuments, sites with anthropological, archeological, or historic value, and, in general, sites belonging to cultural heritage", including areas of paleontological interest.

Although heritage is specifically recognized as a relevant environmental variable, it is recognized that it will be affected by a negative impact, and the presence of a suitable professional is proposed, in order to undertake continual monitoring during the construction phase; nonetheless, the EIS does not contain plans to integrate this action into the environmental monitoring plan.

Clarify these contradictions.

Thematic responses

ARQ Archeological and
Paleontological Sites:
Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

ARQ.01
Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
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- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum 1**.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

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ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material
- b) creation of a viewpoint
- c) fossil trail

For more information and details on the preservation of heritage value and

paleontological resources, please see **Annex 14 of Addendum 1**.

ARQ.03 Scientific research

The scientific and cultural importance of the paleontological resources present has been recognized by the PHAM Project Owner, leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the Project Owner has taken on a commitment to enhance knowledge of the area before starting planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may be detected during the course of construction under the PHAM. These activities will contribute not only to the maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of materials or components present.

For more information, see **Annex 14 of Addendum 1**.

Remark N° 305
Cultural, Paleontological, and Natural
Heritage
Preventive Measures:

In order to protect heritage resources, the Project Owner plans to obtain "*continual on-site expert advisory services to prevent or minimize impact*" (table 7). At which work sites will archeological monitoring be implemented? This question should also be taken to include muck disposal sites, sites for the extraction of aggregates and sand, and works involving improving, widening, and maintaining roads.

Furthermore, we do not consider this measure to constitute a "risk and accident prevention measure", for the reasons expressed in the previous point.

Thematic responses

ARQ Archeological and
Paleontological Sites:
Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

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For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

ARQ.01
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- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum**.

ARQ.02 Values preservation

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The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material**
- b) creation of a viewpoint**
- c) fossil trail**

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

Remark N° 306
Cultural, Paleontological, and Natural
Heritage
Sites of Paleontological Interest

The Project Owner plans to conduct a complementary paleontological study in advance of construction, and to implement certain management measures to protect the resources currently registered with the SPACH, and other resources that may be discovered. In this regard, during the evaluation of the first EIS presented, which is currently under review, the CMN, which is the competent body in the field, has already issued a request for the preparation of a report that has yet to be produced.

When does the Project Owner plan to comply with this requirement? Specifically, what are the "management measures" that the Project Owner plans to implement to protect these resources?.

Thematic responses

ARQ Archeological and
Paleontological Sites:
Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

ARQ.01 Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum**.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material
- b) creation of a viewpoint
- c) fossil trail

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

ARQ.03 Scientific research

The scientific and cultural importance of the paleontological resources present has been recognized by the PHAM Project Owner, leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the Project Owner has taken

on a commitment to enhance knowledge of the area before starting

planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may be detected during the course of construction under the PHAM. These activities will contribute not only to the maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of materials or components present.

For more information, see **Annex 14** of **Addendum 1**.

Remark N° 307
Cultural, Paleontological, and Natural Heritage
Annex 43 Minutes of Meeting between SPACH and Gener

This annex contains the minutes of a meeting held on January 3, 2008, and it is therefore not appropriate to cite it in the Project assessment currently under review. Furthermore, it is there stated that the issue of paleontological heritage is outside of the remit of the PAC and ICSARA (we assume that this refers to the EIS that was withdrawn), and yet the Project Owner states that "AES Gener thanks the SPACH for highlighting the scientific and cultural value of these bodies of evidence, which it recognizes and respects, and although they do not fall within the established procedure it shall include them as part of the citizen participation process". As stated in point 4 of this document, the CMN (the applicable competent body) has yet to issue a statement on the significance of these paleontological resources, and requested the preparation of a report complying with the items specified in the corresponding ordinance. The Project Owner has yet to respond to this requirement. Additionally, the minutes contained in Annex 43 also set forth a series of items agreed with the SPACH, including: "Based on these concepts, within the next two days the SPACH shall prepare a methodological proposal to form an agreement with AES Gener regarding the scope, by means of a joint agreement that includes the commitments made in the agenda." If this proposal must be submitted by January 05, why was it not included in the study currently under review? The following item states that: "All necessary permits shall be submitted for procedures conducted by the SPACH, and this body shall be directly involved in the procedures to be implemented." In this regard, the Project Owner is requested to indicate the name of the qualified paleontologist who shall be responsible for obtaining these permits.

The Project Owner is hereby informed that the permits granted by the CMN for intervention in this type of resource are personal and non-transferable in nature, and therefore cannot be requested by the SPACH. Requests made to the CMN must specify a number of points, including the professional responsible for the activity, work team, specialists who are to analyze materials, and methodology for excavation or recovery of finds, and analysis (see the regulations on Law 17,288, on persons authorized to conduct surveys and request permits to excavate and intervene affecting such resources). Finally, the Project Owner is hereby informed that excavation permits constitute a sector environmental permit, and as this permit is necessary, it should already be requested under the study presented in the plan for compliance with environmental legislation in force (Point 2 of the executive summary)

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

ARQ.01 Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum**.

1.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing

signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access

restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) **production of cultural information material**
- b) **creation of a viewpoint**
- c) **fossil trail**

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

Remark N° 308
Cultural, Paleontological, and Natural
Heritage
El Morado Natural Monument

CONAF, in Ordinance 30 dated February 5, 2008, and Ordinance 70 dated April 9, 2008, requested that the line taken by the tunnel be adjusted so as not to enter this protected area, as it considered that the Project Owner had been unable to guarantee that the construction and operation of the El Volcán Tunnel would not lead to impacts on the resources and processes that the area protects - in particular, geological and geomorphological processes and features, including the glacier and fossil-bearing strata; rather, the Project Owner was only able to express that the occurrence of problems or contingencies was of low likelihood.

This monument was created with the purpose of *“Preserving an ecosystem that is representative of the upper Maipo River basin (Morales Stream) by protecting its natural scenic beauty, its geological and geomorphological processes, and its living organisms facing conservation challenges”* (...) *“The area’s specific conservation objectives include the preservation of the geological and geomorphological processes and features present in the Area, including the glacier and fossil-bearing strata; protection of the Area’s natural scenic beauty, including its glacier, vegetation, lake, streams, mineral waters, and fossil-bearing rock strata, and support of scientific research into its natural and cultural resources, permitting the enhancement of knowledge regarding the area”* (CONAF).

Clarify these contradictions, and explain why the modification requested have not been implemented.

Thematic responses

ARQ Archeological and
Paleontological Sites:
Heritage

According to the results of archeological survey activities and background information compiled, the Project’s area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project’s area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
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For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

ARQ.01
Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
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- Archeological recovery plan for any finds discovered during expert supervision.
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ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a “restricted zone” with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

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iv) Compe neasures

- a) a)production of cultural information material**

- b) creation of a viewpoint
- c) fossil trail

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

ARQ.03 Scientific research

The scientific and cultural importance of the paleontological resources present has been recognized by the PHAM Project Owner, leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the Project Owner has taken on a commitment to enhance knowledge of the area before starting planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may be detected during the course of construction under the PHAM. These activities will contribute not only to the maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of materials or components present.

For more information, see **Annex 14 of Addendum 1**.

Remark N° 309
Cultural, Paleontological, and Natural
Heritage
Protected areas: La Engorda
Meadow

The EIS contains plans to alter these meadows/wetlands through installing pipelines running underneath them, construction of inlets, and construction of certain access routes and the El Morado siphon. In this regard, it can be stated that - as is suggested by its name - this meadow and the vegetation that surrounds it represent a unique ecosystem, which is of particular importance due to its use fattening up livestock. Nonetheless, the Project does not feature suitable mitigation and compensation measures.

The Project Owner should include the mitigation and compensation measures that it therefore plans to implement.

Thematic responses

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles,

70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neoporteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Lilolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic

communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

F&F.02.02 Mitigation

Aquatic flora and fauna

The Project calls for a suite of multi-purpose environmental management measures that aim to minimize its effects on living organisms, including: minimization of watercourse areas to be subject to intervention by prioritizing such works for late summer and early fall seasons (period of lowest flow rates), the adoption of special precautions to prevent accidental spillages into watercourses (prohibition of the storage of lubricant drums in or near watercourses, etc), and permanent maintenance of ecological flow rates.

For more detailed information, including technical documentation that complements the information described above, see Annex 17 of the Addendum.

Terrestrial Flora and Vegetation

In order to prevent and/or minimize the Project's effects on plant life, it plans to adopt a number of integrative measures: micro-routing in advance of starting work on-site, in order to identify specimens of plants listed in any conservation category and subject to impact; compensation with the planting of 10 specimens for every one destroyed, in the case of non-woodland species listed for conservation; implementation of a woodland management plan applicable to woodland areas, which describes its measures in accordance with Article 5 of the Woodland Law; implementation of vegetation restoration plans at muck disposal sites, encampments, artificial slopes, and tunnel access terraces (EIS, Annexes 7 and 29). More in-depth information on complementary measures is provided in Annex 6 of Addendum 1.

Terrestrial fauna

Specific wildlife environmental management measures have been proposed for each particular species, taking into account prior experience in the success of these measures in similar projects. These measures will be implemented in continual coordination with the Servicio Agrícola y Ganadero. Principal measures include: capture of individuals belonging to species of conservation interest for rescue and relocation; controlled perturbation actions; and habitat replacement. Other measures are based on the use of signage, training for Contractors, and contractual requirements for on-site supervision (see details in Section 6.4.1.6 of the EIS).

See Annex 4 of the Addendum for the native wildlife rescue and relocation plan.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as

making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

SUE.01 Regulations

The Project Owner is subject to the following regulations, which are specified in detail in Chapter 5 of the EIS, Section 5.7.2.1, regarding the Santiago Metropolitan Master Plan.

With regard to planning instruments, the PHAM is to be implemented in the district of San José de Maipo, which does not have a District Master Plan (one is currently being prepared), and which only has current urban limits for the settlements of San Alfonso, La Obra, San José de Maipo, El Melocotón, San Gabriel, and Las Vertientes. Conversely, the Santiago Metropolitan Master Plan (PRMS) establishes a number of land use regulations that apply to the project area, most of which are related to ecological preservation and/or protection and risks. Most of the district's surface area is classed as Ecological Preservation Area, which aims to maintain a zone's natural state, in order to preserve and contribute to the environment's quality and equilibrium, as well as to preserve landscape heritage (see further information in the conclusions stemming from analysis of regulations, in Section 5.7.3, Chapter 5 of the EIS).

Supreme Decree 366 (Exploitation of Tamarugo, Carob, Chañar, Guayacán, Aextoxicon, Charcoal, Acacia, Boldo, Maiten, Litre, Bollen, and Quillay). This legal instrument governs the felling of trees and bushes.

Supreme Decree 4363 and D.L 701 (Approving the Definitive Text of the Law on Woodland and Regulations on Forest Promotion).

Article 2 of the Woodland Law establishes an obligation that land classified as for preferential woodland land use, as well as natural and artificial woodlands, are subject to woodland management plans approved by the National Forestry Commission (CONAF). Furthermore, Article 21 of Decree Law 701 establishes that any felling or usage of native woodland shall be subject to the CONAF's prior approval of the corresponding management plan.

Decree 82 (Prohibiting the Felling of Trees and Bushes in Indicated Andean High Mountain and Foothill Areas)

Article 102 Sector Environmental Permit (Permit for the felling or exploitation of native woodland, in any type of land, or plantations located in land with preferential characteristics for woodland use).

For further information and analysis on the aforementioned regulations and permits, as applicable to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see Sections 3.2.6 and 3.3.7 in Chapter 3 of the EIS.

SUE.02 Soils, meadows, and wetlands

The Project Owner has conducted a number of studies with the aim of characterizing the vegetation of summer grazing areas (La Engorda) (see details in Addendum 1, Annex 6, and in Chapter 5 of the EIS), as well as flora and vegetation studies in the Project's area of influence (EIS, Chapter 5).

These studies contain information compiled in fieldwork campaigns conducted in Fall 2005, Spring 2006, November 2007, March 15 and 16, 2008, and September 2008, which add to the body of knowledge available regarding vegetation in these areas.

The Lo Encañado area shall be assigned a status of controlled access area for works contractors at all times: it shall not be subject to any intervention whatsoever. For more information on vegetation areas that could be affected by the construction works, and to learn about mitigation measures proposed by the Project Owner, you are advised to review Annex 42 of the EIS and Annex 6 of the Addendum.

With regard to environmental regulations that apply specifically to vegetation and plant life, the Project Owner shall be subject to:

Supreme Decree 366 (Exploitation of Tamarugo, Carob, Chañar, Guayacán, Aextoxicon, Charcoal, Acacia, Boldo, Maiten, Litre, Bollen, and Quillay). This legal instrument governs the felling of trees and bushes.

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For further information and analysis on the aforementioned regulations and permits, as applicable to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see Sections 3.2.6 and 3.3.7 in Chapter 3 of the EIS.

Remark N° 312 Upper Maipo Basin Area Usage Flow Rate

The project plans establish a total water abstraction rate in the Upper Maipo Basin area of 27 m³/s. It is not made clear from where this flow rate will be abstracted, given that the maximum statistical monthly average for flow rate in the Yeso River is approximately 11 m³/s. The question is: what sites will be affected by the project - perhaps the El Yeso Reservoir - to achieve this flow rate?

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies

in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as

well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 313 Mitigation, Restoration, and Compensation Measures

What concrete social benefits will AES Gener contribute to the local community, given that it shall make commercial use of the valley's water and landscape resources, which belong to all Chileans, and not to foreign companies like AES Gener? Indicate direct benefits in the fields of health, education, housing, etc. To benefit the citizens not only of Santiago but also of the local area.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

CAL.02 Education

A goal of the Maitenes Foundation relates to education for children and young people against the backdrop of the natural environment (for more information on the goals and achievements of the Foundation, see Annex 26 of the EIS).

Gener firmly believes that contributions to the technical and vocational education and training of young people must keep sight of real employment possibilities. Therefore, as a first initiative it has earmarked resources for an education improvement project in the district, which will contribute to establishing education management for the restructuring of the school curriculum and professional technical capacity building, taking into account the features needed to boost local employability. Based on information and recommendations from this study, Gener, acting through the Maitenes Foundation, will undertake a Capacity Building for Employability Program fundamentally oriented towards those whose family, social, or economic situation has barred them from completing their education and training, or acquiring the skills needed in order to find work.

CAL.03 Sports and leisure areas

In order to avoid the loss or modification of land usage patterns, changes in usage, or loss of income associated with potential reduction in perceptions of the value of the surrounding areas, in terms of the provision of leisure, tourism, education, and other related services, the Project has developed a suite of measures that aim to minimize its environmental impact, so as to preserve the features that lead to the high perception of value of the area among residents, visitors, and tourists. These measures include: installation of most works in underground settings, thus minimizing their visual impact; the preservation of ecological flow rates in rivers and streams; and revegetation and reforestation of affected areas.

Similarly, the Project has enacted a suite of further measures to minimize interference with traditional livestock industries, as well as tourism and mountain/river sports.

In this way, the Project has taken all steps necessary in order to mitigate impacts on the environment, which will allow the area to retain the characteristics that make it so attractive for open-air education, tourism, and leisure activities. This will allow the project to operate alongside existing activities conducted in this area.

A wide-ranging suite of monitoring activities will be implemented to verify the effectiveness of the environmental measures (for more information, see **Chapter 8 of the EIS**). In parallel, and in order to verify that the Project does not affect cultural land usage patterns, applicable indices will be included for monitoring under the Social Indicator Monitoring (SIM) program.

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

Remark N° 315 Upper Maipo Basin Area Usage Flow Rate

The Project plans establish a total water abstraction rate in the Upper Maipo Basin area of 27 m³/s. It is not made clear from where this flow rate will be abstracted, given that the maximum statistical monthly average for flow rate in the Yeso River is approximately 11 m³/s. The question is: does the project plan interventions affecting the El Yeso Reservoir?.

Thematic responses

AGU Water

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The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

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The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

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For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.05 Drinking water supply

Construction works and/or activities involved in the project (roads, movement of materials, transport of different products, etc) shall have no effect or impact whatsoever on the quality or security/safety of water supply in the Maipo River system. During the construction phase, Project interventions affecting watercourses shall cause only temporary effects resulting from Earth moving during excavation and other construction activities. This intervention shall affect small areas over short time periods, as it shall last only during the period while these installations are under construction (see **Section 6.4.1.4 of the EIS and Section VII, Question 17, in the Addendum**).

During operations, the PHAM shall not affect the Laguna Negra-Lo Encañado and El Yeso

Reservoir system, which is managed by the company Aguas Andinas S.A, in its capacity as holder of the drinking water concession for Santiago; nor shall the Project affect the operational dynamics of the drinking water supply system. Therefore, the implementation of the PHAM does not imply any impact whatsoever on the supply of drinking water (see **Section I, responses 27 and 29, in the Addendum**).

Furthermore, the water abstracted by the Project shall be returned to the river 5 km upstream of the

Toma Independiente or Independent Intake, operated by the company Aguas Andinas S.A., which abstracts water for drinking water supply to the city of Santiago; therefore, the PHAM shall not affect normal operations of this system. The PHAM shall only affect the delivery point of water in the tributaries of the Maipo River; in other words, water that currently does not drain into the Maipo River shall not be incorporated into that river's total flow.

However, in the event that an incident may arise as a result of an accident during construction, such as accidental spillages or rock falls, the procedures described in the Contingency Plan shall be implemented, consisting of a suite of actions to solve associated problems. This plan is explained in detail in **Chapter 7 of the EIS, Section 7.2.5**.

AGU.05.01 Drinking water quality

The process of hydroelectric power generation does not affect the physical/chemical qualities of water. Additionally, the PHAM does not plan to implement regulation installations that retain sediment. Thirdly, downstream of the discharge point the natural river conditions are maintained with regard to flow rate and physical/chemical properties.

During the construction of installations to be located in watercourses, the free-flowing course of the river is maintained through the construction of diversions through pipes laid along the river course for such purposes, or through channels that divert all flow, allowing free water circulation with no effect whatsoever on quality (see **Section I, Question 28, in the Addendum**).

The Project owner shall not make use of the Lo Encañado Lake or water usage rights owned by Aguas Andinas S.A. for this Project, instead opting to forgo usage of these resources and to replace the role that would have been fulfilled by the Lo Encañado Lake with a forebay located on a widening of the Alfalfa II plant headworks, located in the Alto Aucayes area on the Colorado River Valley (for details, see **EIS 2.2.1**). The Lo Encañado area shall be assigned a status of controlled access area at all times: it shall not be subject to any intervention whatsoever.

The Project Owner has made available a Water Quality Monitoring Program, with specifications for application during both the construction and operations phases. This program espouses a commitment to verify the effectiveness of environmental control measures designed to minimize the effects of works construction activities during the construction phase.

For further information on the Monitoring Program, see **Sections 8.2 and 8.3** in **Chapter 8 of the EIS**.

Remark N° 318 Drinking Water

Ideally this should be extracted from a borehole into the distribution tank, to prevent it from being contaminated by snow melt or rain.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

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During operations, the PHAM shall not affect the Laguna Negra-Lo Encañado and El Yeso Reservoir system, which is managed by the company Aguas Andinas S.A, in its capacity as holder of the drinking water concession for Santiago; nor shall the Project affect the operational dynamics of the drinking water supply system. Therefore, the implementation of the PHAM does not imply any impact whatsoever on the supply of drinking water (see **Section I, responses 27 and 29, in the Addendum**).

Furthermore, the water abstracted by the Project shall be returned to the river 5 km upstream of the Toma Independiente or Independent Intake, operated by the company Aguas Andinas S.A., which abstracts water for drinking water supply to the city of Santiago; therefore, the PHAM shall not affect normal operations of this system. The PHAM shall only affect the delivery point of water in the tributaries of the Maipo River; in other words, water that currently does not drain into the Maipo River shall not be incorporated into that river's total flow.

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The Project Owner has made available a Water Quality Monitoring Program, with specifications for application during both the construction and operations phases. This program espouses a commitment to verify the effectiveness of environmental control measures designed to minimize the effects of works construction activities during the construction phase.

For further information on the Monitoring Program, see **Sections 8.2 and 8.3 in Chapter 8 of the EIS**.

Remark N° 319 Drinking Water and Roads

This project should use tunnel openings to aim to deposit muck in safe areas (geologically stable) where sediments and acids from the reaction of muck with rainwater do not run off into natural watercourses.

Earth moved for road construction should not be discarded as offspill down hillsides, but should rather be transported to landfills of muck disposal heaps, so as to avoid excessive habitat destruction.

Thematic responses

MAR Muck

The PHAM plans to construct approximately 70 km of tunnels. The excavation of these tunnels will generate inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of inert material produced in road building and the construction of buried conduits.

This muck material will be deposited in the 14 muck disposal heaps that the Project plans to create. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria. For more information, please see **Annex 6 of the EIS** and **Annex 3 of the Addendum**.

MAR.01 Regulations

The Project Owner has made available a Management Plan for "Project Muck Disposal Heaps", which contains information on the technical, environmental, and safety specifications of the heaps, as well as recommendations contained in the Ministry of Public Works' 2004 Environmental Management Plan Manual for Works Subject to Concessions. In particular, the Plan establishes the environmental considerations adopted for the operation of the muck disposal heaps, to be implemented during the construction of tunnels and roads under the PHAM.

In order to comply with the environmental management measures contained in the EIS, an Environmental Monitoring Program will be conducted, with the aim of verifying the effectiveness of these measures and compliance with them. For details on the principal actions included in the Monitoring Program, and for the various stages of functionality of the muck disposal sites, see **Annex 6 of the EIS** and **Annex 3 of Addendum 1**.

For more information on the specific regulations applicable to the Project, and compliance therewith, see **Chapter 3 of the EIS**.

MAR.02 Location

The PHAM calls for the creation of 14 muck disposal heaps, for the disposal of waste material from tunnel boring and smaller quantities of inert waste from the construction of roads and buried conduits. Maps of the muck disposal heaps, and a copy of the muck disposal heap management plan, are included in Annex 6 of the Project EIS.

For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria.

From a technical and safety perspective, the muck disposal heap sites have been located as close as possible to exit points from tunnels and to surface work sites, in areas not at risk to landslides or landslip events.

The following aspects have been taken into account as environmental criteria in site selection:

Sites have been selected that are distant from any settlements or any housing used on a permanent or temporary basis.

Priority has been given to selecting sites with low visual impact - that is, in areas that are distant from potential observation points on public highways or high ground.

In the Project area's higher elevation regions, the disposal heaps have been sited up against natural topological features, such that the emplacement of the heaps' layers forms a continuation of the general landform structures of the area.

In general these are areas that are of low value as a habitat for plant life (soils with usage capacity ratings V, VI, and VII), and efforts have been made to avoid modifications to the original land form structures present or to surface watercourses.

Surface surveys have been conducted in all of these regions, as details in **Section 5.8, in Chapter 5 of the EIS**, to rule out the presence of sites of archeological and/or paleontological value at the muck disposal heap sites.

For more information, see **Annex 6 of the EIS** and **Annex 3 of Addendum 1**.

MAR.03 Characteristics

The material to be deposited in the muck disposal heaps will be inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of waste material produced in road building and the construction of buried conduits. It is expected that a total of 1.7 m cubic meters of TBM muck will be produced.

The total volume of material to be disposed of is estimated at 2.7 m cubic meters, including uncompacted rock and soil; this material will be disposed of at the 14 muck disposal heap sites

planned under the PHAM. Maps of the muck disposal heaps, and a copy of the muck disposal heap management plan, are included in Annex 6 of the EIS.

The waste material produced through tunnel excavation, road building, and construction of buried conduits during the construction phase will be deposited in a series of layers forming terraces. The muck disposal heaps will be built up in an organized manner, forming level and safe platforms, with slopes at the sides with the natural gradient formed by the material in question, thus ensuring stability and permitting adequate drainage. All of these design features are in conformity with the muck disposal heap construction method and environmental measures indicated in **Section 4.2 of Annex 6 of the EIS, and Annex 3 of Addendum 1**.

Finally, the filling will be covered with 20 cm of organic soil, permitting the definitive finishing of the spoil heap.

Management and restoration techniques for the 14 muck disposal heaps are indicated in Annex 29, "Restoration Plan", which includes information on surface treatments.

MAR.04 Impact

All of the measures adopted for the creation, operation, and abandonment of the muck disposal heaps will be implemented by the Works Contractor. Gener will undertake an environmental monitoring plan addressing the management and usage of the sites, which will include site inspections and periodic review of site entry records.

Rainwater will be managed using specially designed channeling works, the details of each of which are indicated in the plans attached in Annex 6 of the EIS.

The Project Owner's reiterates its commitment to undertake an exhaustive program to rescue low mobility fauna in the area of direct influence of PHAM works (including the area to be occupied by the 14 sites where muck, spoil, and earth will be disposed of in heaps). This wildlife rescue will require the application of capture techniques suitable for small mammals, reptiles, and amphibians. **Annex 4 of Addendum 1** presents the Wildlife Rescue and Relocation Plan.

Even following surveys ruling out the presence of archeological or paleontological sites or finds in the muck disposal heap sites, the PHAM also includes a series of measures designed to prevent any intervention in sites with heritage value, with the implementation of restricted areas and training programs for contractor personnel. For more information, see **Annex 14 of Addendum 1 and Annex 33 of the EIS**, "Restricted areas".

MAR.05 Composition and Hazardousness

Although the waste material produced from tunneling activities will be inert - in the construction of tunnels for the Alfalfa Plant, where 35 km of tunnels were excavated, no evidence was found of material that could lead to acidic or basic drainage in contact with rainwater - the PHAM includes a management plan applicable to water that may be produced from contact between muck or waste rock and rainwater or snow. For further details, see Annex 6 of the EIS.

The Project Owner plans to take measurements to assess the possibility of acidic drainage at the muck disposal heap sites, as indicated in **Annex 6, Section 5 in the EIS** and **Response 10 in Section 9 of Addendum 1**. The actions will form part of the Environmental Monitoring Plan, and will be preventive rather than response actions.

Remark N° 320 The Living Valley

In truth, rather than questions that have no answers, my remark is a call to action, as there is no way back from the destruction of nature, because the condors that abandon their nests on rocky crags because of the explosions, the fox chased by hostile humans invading its territory **will not return** and all the energy in the world will not pay for these losses, because I will no longer have anything fitting to point out to my grandson in the sky, it will no longer be worth waiting for the clouds around the mountaintops to clear after the rain to gaze upon these marvels, which they say **are protected, but now they will not be.**

Let us care for the little of the natural world that remains for us, let us protect the environment because if not, it will die.

To come back down to earth, I ask you: will there be any responsible body to oversee respect for the earth, the water, and the life of the Cajón del Maipo, if this project - which features so many anomalies in its presentation, and that also lacks the water needed to make a hydroelectric plant work - goes ahead?

Who will be the members of this body to oversee the contractors, their employees, and the project's works, if the project is approved? Who in our community will be a part of that? And who will cover the costs for these advisory services, and issue the reports on such monitoring?

Thematic responses

OTR Other

This section relates to certain special situations that could not be categorized, or that are linked to specific requests, disqualifications, or situations that feature a clear political component, against either the environmental authority or the Project Owner.

OTR.02 CONAMA

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly

frequented, minimizing their visual impact.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1)

Chapter 3 of the EIS provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

Remark N° 321 Las Lajas Forebay

Maximum security fence to avoid all types of accidents.

Thematic responses

RSG Risk

The Project Owner possesses a general risk prevention strategy that imposes certain measures on the Project during its different stages of advance. This strategy features the following components:

- a) Measures incorporated into the Project's engineering design.
- b) Systematic verification of compliance with applicable regulations
- c) Establishment of restricted areas
 - c.1) Area restricted due to their archeological, paleontological, or heritage value
 - c.2) Area of natural value that requires protection by the Project
 - c.3) Officially protected area.
- d) Expert supervision during construction
- e) Training regarding environmentally sensitive issues
- f) Internal risk management and accident prevention programs
- g) Separation of works installations and encampments

For further information on each of these points, please see **Chapter 7 of the EIS**, which specifies the **Environmental Management Plan**, the **Risk Control and Prevention Plan** designed for the Project, the safety measures to be adopted in light of the risks identified, and, finally, the **Accident control plan**, to be activated in the event of the failure of the preventive measures taken by the Project Owner. Furthermore, **Annex 32 of the EIS** presents the **Risk and Contingency Prevention Plan** for contractors.

RSG.01 Load rejection

During the operation of the power plants, situations may arise that necessitate the stoppage of one or both plants for a certain period of time. Two temporary phenomena occur at such times, the effects of which must be analyzed. These phenomena are mass oscillations within tunnels carrying water under pressure, and impact on the Maipo River system's flow dynamics.

A special situation arises in the operation of a hydroelectric plant when a sudden stoppage occurs affecting its power generation units or discharge spillways. Load rejection can arise as a result of automatic shutoffs caused by internal or external failures:

- Internal. These situations relate to technical problems within the power plant that require the stoppage of the turbines. This can arise due to a mechanical failure (valve or turbine failure) or an electrical fault in the mechanisms that operate the generator units, or in the high tension switchgear (switches or power line distributors).
- External. External events can lead to total system failure (black out), which is a less frequent situation. This can be caused by a break in the power transmission line that serves both power plants.

Fortunately, such events are infrequent; by way of illustration, see **EIS Annex 17, Table 3.1**, which shows a summary of load rejections that occurred at the Alfalfal Power Plant from 2004 to 2007.

For further information on the analyses taken into account for different potential cases of failures in the power generation units in the Alto Maipo plants, please see **Annex 17 of the EIS and Annex 16 of Addendum 1**.

Remark N° 322 Employee Encampment

The construction workers' encampments should be sited a considerable distance from settlements, thus avoiding excessive contact between the floating worker population and local residents.

Thematic responses

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

PRO.03.03 Encampments and Works Installations

For details on the creation of encampments and works installations, please see Chapter 2, Section 2.3.2.4 in the EIS.

For information on PHAM encampment and work site approach routes, see EIS, Chapter 2, Table 2.1.2,

For information on regulations, see Chapter 3 of the EIS and Annex 33, General Operating Regulations for Encampments and Work Sites.

For information on the management of waste produced at work sites and encampments, see Annex 18 of the EIS, "Site Installation Waste Management Plan".

For information on the discharge of treated wastewater, see Response 26 in the Addendum.

For information on human consumption of water at encampments and works installations, see Chapter 2, Section 2.3.2.4, parts b and i.

For an assessments of the impact of the creation of encampments and works installations, monitoring methods, and conditions, see Chapter 6 of the EIS.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.02 Human contingent presence

The presence of Project employees will be temporary (limited both to the years of the construction phase, and to the working day organized into shifts), thus disincentivizing them and their families from moving to the area on a permanent basis. During the Project's construction phase, its employees shall sleep in the encampments described in the documentation, not making use of existing hotels and hostels located in and near the area's settlements.

Once the construction phase has been completed, the Project's installations and encampments shall be removed; they shall therefore not become part of existing settlements, or form new centers for the formation of settlements.

The PHAM plans call for the creation of 5 encampments, located away from settlements. These encampments will be operated as described in Annex 33, and each will house a permanent contingent of 200-400 employees, under the standard working regime adopted by mining installations. The transport of employees from the encampments to their places of residence shall have a frequency determined in accordance with the working shifts. Therefore, it is important to

understand that under no circumstances shall the presence of Project employees in the area lead to the type of interaction with

the resident community and demand for local services that currently occurs as a result of the flow of tourists and visitors, mainly during weekends, holidays, and the summer season.

In view of the above, the Project shall not lead to the following potential impacts: overpopulation at a local or district level (in existing settlements); or effects modifying local customs, economic service provision activities, connectivity, and local load capacity (understood to refer to the load placed on infrastructure and equipment).

As indicated in Annex 39 of the EIS, documentation supporting the analysis described above shall form part of activities under the Social Indicator Monitoring (SIM) program. This monitoring program is based on compiling information using qualitative and quantitative techniques developed in the field of Social Sciences, oriented towards investigating a suite of indices that pay due heed to trends in relevant variables for monitoring, selected in accordance with the characteristics of the Project and of the communities in the area where it is to be implemented. Reports will be issued twice per year containing the results obtained, including the use of graphical aids to show comparative changes in parameters from one study campaign to the next. This document will be delivered to CONAMA.

In general, by gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project may cause in its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities.

Remark N° 323 Maitenes Tailrace

Conditions should be improved in general, as there is currently no protection whatsoever on the side facing the settlement of Maitenes.

Thematic responses

RSG Risk

The Project Owner possesses a general risk prevention strategy that imposes certain measures on the Project during its different stages of advance. This strategy features the following components:

- a) Measures incorporated into the Project's engineering design.
- b) Systematic verification of compliance with applicable regulations c)
Establishment of restricted areas
 - c.1) Area restricted due to their archeological, paleontological, or heritage value
 - c.2) Area of natural value that requires protection by the Project
 - c.3) Officially protected area.
- d) Expert supervision during construction
- e) Training regarding environmentally sensitive issues
- f) Internal risk management and accident prevention programs g)
Separation of works installations and encampments

For further information on each of these points, please see **Chapter 7 of the EIS**, which specifies the **Environmental Management Plan**, the **Risk Control and Prevention Plan** designed for the Project, the safety measures to be adopted in light of the risks identified, and, finally, the **Accident control plan**, to be activated in the event of the failure of the preventive measures taken by the Project Owner. Furthermore, **Annex 32 of the EIS** presents the **Risk and Contingency Prevention Plan** for contractors.

RSG.01 Load rejection

During the operation of the power plants, situations may arise that necessitate the stoppage of one or both plants for a certain period of time. Two temporary phenomena occur at such times, the effects of which must be analyzed. These phenomena are mass oscillations within tunnels carrying water under pressure, and impact on the Maipo River system's flow dynamics. A special situation arises in the operation of a hydroelectric plant when a sudden stoppage occurs affecting its power generation units or discharge spillways. Load rejection can arise as a result of automatic shutoffs caused by internal or external failures:

- Internal. These situations relate to technical problems within the power plant that require the stoppage of the turbines. This can arise due to a mechanical failure (valve or turbine failure) or an electrical fault in the mechanisms that operate the generator units, or in the high tension switchgear (switches or power line distributors).
- External. External events can lead to total system failure (black out), which is a less frequent situation. This can be caused by a break in the power transmission line that serves both power plants.

Fortunately, such events are infrequent; by way of illustration, see **EIS Annex 17, Table 3.1**, which shows a summary of load rejections that occurred at the Alfalfal Power Plant from 2004 to 2007.

For further information on the analyses taken into account for different potential cases of failures in the power generation units in the Alto Maipo plants, please see **Annex 17 of the EIS and Annex 16 of Addendum 1**.

Remark N° 325 Upper Maipo Basin Area Usage Flow Rate

The Project plans establish a total water abstraction rate in the Upper Maipo Basin area of 27 m³/s. It is not made clear from where this flow rate will be abstracted, given that the maximum statistical monthly average for flow rate in the Yeso River is approximately 11 m³/s. The question is: will the management of the El Yeso Reservoir cause any intervention? And what we have not mentioned is that **ecological flow rates** should be respected.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.05 Drinking water supply

Construction works and/or activities involved in the project (roads, movement of materials, transport of different products, etc) shall have no effect or impact whatsoever on the quality or security/safety of water supply in the Maipo River system. During the construction phase, Project interventions affecting watercourses shall cause only temporary effects resulting from Earth moving during excavation and other construction activities. This intervention shall affect small areas over short time periods, as it shall last only during the period while these installations are under construction (see **Section 6.4.1.4 of the EIS and Section VII, Question 17, in the Addendum**).

During operations, the PHAM shall not affect the Laguna Negra-Lo Encañado and El Yeso Reservoir system, which is managed by the company Aguas Andinas S.A, in its capacity as holder of the drinking water concession for Santiago; nor shall the Project affect the operational dynamics of the drinking water supply system. Therefore, the implementation of the PHAM does not imply any impact whatsoever on the supply of drinking water (see **Section I, responses 27 and 29, in the Addendum**).

Furthermore, the water abstracted by the Project shall be returned to the river 5 km upstream of the Toma Independiente or Independent Intake, operated by the company Aguas Andinas S.A., which abstracts water for drinking water supply to the city of Santiago; therefore, the PHAM shall not affect normal operations of this system. The PHAM shall only affect the delivery point of water in the tributaries of the Maipo River; in other words, water that currently does not drain into the Maipo River shall not be incorporated into that river's total flow.

However, in the event that an incident may arise as a result of an accident during construction, such as accidental spillages or rock falls, the procedures described in the Contingency Plan shall be implemented, consisting of a suite of actions to solve associated problems. This plan is explained in detail in **Chapter 7 of the EIS, Section 7.2.5.**

AGU.05.01 Drinking water quality

The process of hydroelectric power generation does not affect the physical/chemical qualities of water. Additionally, the PHAM does not plan to implement regulation installations that retain sediment. Thirdly, downstream of the discharge point the natural river conditions are maintained with regard to flow rate and physical/chemical properties.

During the construction of installations to be located in watercourses, the free-flowing course of the river is maintained through the construction of diversions through pipes laid along the river course for such purposes, or through channels that divert all flow, allowing free water circulation with no effect whatsoever on quality (see **Section I, Question 28, in the Addendum**).

The Project owner shall not make use of the Lo Encañado Lake or water usage rights owned by Aguas Andinas S.A. for this Project, instead opting to forgo usage of these resources and to replace the role that would have been fulfilled by the Lo Encañado Lake with a forebay located on a widening of the Alfalfa II plant headworks, located in the Alto Aucayes area on the Colorado River Valley (for details, see **EIS 2.2.1**). The Lo Encañado area shall be assigned a status of controlled access area at all times: it shall not be subject to any intervention whatsoever.

The Project Owner has made available a Water Quality Monitoring Program, with specifications for application during both the construction and operations phases. This program espouses a commitment to verify the effectiveness of environmental control measures designed to minimize the effects of works construction activities during the construction phase.

For further information on the Monitoring Program, see **Sections 8.2 and 8.3** in **Chapter 8 of the EIS.**

Remark N° 326 Ecological Flow Rates and Baseline Studies

The Project establishes an ecological flow rate for the Colorado River at 0.6 m³/s. This flow rate is outside of the bounds stipulated in the DGA Manual of Regulations and Procedures, which specifies that the value must be 10% of average annual flow rate - in this case, 3.1 m³/s plus environmental demand.

Our studies indicate that the Yeso River dries out, the La Engorda Stream dries out, the Colina Stream dries out, the Las Placas Stream dries out, the Morado Stream dries out, and the Colorado River almost dries out, being left with a minimal flow rate. The ecological flow rates defined at the intakes will soak into the ground and not flow along the watercourses in question to their points of confluence with more major rivers, leaving them dry.

Ecological flow rates are determined based on the Environment Law, Law 19,300 and respecting the rights of third parties.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4 in Chapter 2 of the EIS**.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17 of the Addendum**.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to

intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as

well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	Rain gauge station		Stream gauge station
	406,157		6,259,100
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 327 Water Rights

The Project does not hold water rights at any abstraction point. The technical report issued by the Directorate General of Water indicates that the water transfers requested by the company cannot be made, because **it does not physically exist** What will you use to generate the energy that you claim to produce?

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as

making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

Remark N° 328 Water Rights

The Project does not hold concessions for water rights at any abstraction point.

A report prepared by the Directorate General of Water (DGA) indicates that this water **does not physically exist**, as the real flow rate is considerably lower than that quoted in the project documentation, and that if any rights come to be granted, the flow rate in question will not be known; therefore, if the baseline study is based on **suppositions regarding flow rates**, how can the environmental impact study be valid and be approved?

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS**.

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS.**

This section presents information characterizing the basins and tributaries of the Volcán,

Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex 13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS.**

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability

for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 330 Water Rights

The Project does not hold concessions for water rights at any abstraction point.

A report prepared by the Directorate General of Water (DGA) indicates that this water **does not physically exist**, and that if any rights come to be granted, the flow rate in question will not be known; therefore, the baseline study is based on suppositions regarding flow rates.

What is this about, that you want to build a **hydroelectric plant that has no water to use to generate power?**

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS**.

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see **Table 2.3.4** in **Chapter 2 of the EIS**.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to

be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and

2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS**.

This section presents information characterizing the basins and tributaries of the Volcán, Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex

13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS**.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for

low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

Remark N° 331 Water Rights and Base Study

The Project does not hold concessions for water rights at any abstraction point. Given that the project does not hold the water rights that it hopes to use, and that should such rights be granted, the flow rates conceded are as yet unknown, the baseline study is not valid because it is based on suppositions regarding flow rates.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see **Table 2.3.4** in **Chapter 2 of the EIS.**

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site

information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS**.

This section presents information characterizing the basins and tributaries of the Volcán, Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex

13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS**.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the

Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical

variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 332 Auxiliary Discharges

For the free discharge flow of the different channels, used for excess water or emergencies, these channels and the natural watercourses into which they drain should be in good conditions, free of obstacles that could impede free flow; in this case, particular care should be taken with the Aucayes Stream, which passes along one side of the settlement of Maitenes, to prevent erosion of that riverbank. This leads to a need to built erosion protection (riprap).

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum.**

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.04 Discharge effects

Water capture in advance of in-situ gravel removal leads first to a reduction in sediment load in water carried through the headworks to the turbine rooms, while the solid material that is retained is returned to the river. At the point where water is discharged from the plants (Las Lajas area), water that has passed through the turbines - which contains a certain quantity of sediment - once again mixes with the water in the rivers, returning to its original conditions in terms of average sediment load (**Addendum, Section I, Question 28**).

At the point where water is returned to the Maipo River, in the Las Lajas area, there will be no degradation of the riverbed as it is composed entirely of rocks. It should be mentioned that the flow rate discharged from the PHAM at this point is always lower than the flow rate in the Maipo River just upstream.

During the operations phase of the Project, planned maintenance activities do not include any cleaning of tunnels and culverts. Inside the tunnels, the cross sectional area for water flow is small enough to prevent sedimentation. This is shown through the operation of the Alfalfa Plant for 20 years without any cleaning of the tunnels being included among maintenance activities.

The only operations that lead to the discharge of sediment are the discharge of gravel traps at the inlets, and the flushing of the sand traps, returning sediment to the river once a certain volume has built up within them. These operations are conducted intermittently and for short time periods (1 minute for sand traps, 10 minutes for gravel traps), at variable frequency depending on the season. For more information see the **Addendum, Section IV, Question 3.**

RSG Risk

The Project Owner possesses a general risk prevention strategy that imposes certain measures on the Project during its different stages of advance. This strategy features the following components:

- a) Measures incorporated into the Project's engineering design.
- b) Systematic verification of compliance with applicable regulations
- c) Establishment of restricted areas
 - c.1) Area restricted due to their archeological, paleontological, or heritage value
 - c.2) Area of natural value that requires protection by the Project.

- c.3) Officially protected area.
- d) Expert supervision during construction
- e) Training regarding environmentally sensitive issues
- f) Internal risk management and accident prevention programs g)
Separation of works installations and encampments

For further information on each of these points, please see **Chapter 7 of the EIS**, which specifies the **Environmental Management Plan**, the **Risk Control and Prevention Plan** designed for the Project, the safety measures to be adopted in light of the risks identified, and, finally, the **Accident control plan**, to be activated in the event of the failure of the preventive measures taken by the Project Owner. Furthermore, **Annex 32 of the EIS** presents the **Risk and Contingency Prevention Plan** for contractors.

RSG.01 Load rejection

During the operation of the power plants, situations may arise that necessitate the stoppage of one or both plants for a certain period of time. Two temporary phenomena occur at such times, the effects of which must be analyzed. These phenomena are mass oscillations within tunnels carrying water under pressure, and impact on the Maipo River system's flow dynamics.

A special situation arises in the operation of a hydroelectric plant when a sudden stoppage occurs affecting its power generation units or discharge spillways. Load rejection can arise as a result of automatic shutoffs caused by internal or external failures:

- Internal. These situations relate to technical problems within the power plant that require the stoppage of the turbines. This can arise due to a mechanical failure (valve or turbine failure) or an electrical fault in the mechanisms that operate the generator units, or in the high tension switchgear (switches or power line distributors).
- External. External events can lead to total system failure (black out), which is a less frequent situation. This can be caused by a break in the power transmission line that serves both power plants.

Fortunately, such events are infrequent; by way of illustration, see **EIS Annex 17, Table 3.1**, which shows a summary of load rejections that occurred at the Alfalfal Power Plant from 2004 to 2007.

For further information on the analyses taken into account for different potential cases of failures in the power generation units in the Alto Maipo plants, please see **Annex 17 of the EIS and Annex 16 of Addendum 1**.

Remark N° 333
Colorado River at Alfalfal, Riverbank Erosion

Riprap is necessary on the edge of the Colorado River at the populated area of El Alfalfal, as riverbank erosion could directly damage the houses in this area.

This riprap will be a protective measure.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

OTR.01 **Requests**

Remark N° 335 Riverbed Erosion

This will exacerbate existing damage in the intakes of irrigation channels, which are currently suspended due to lack of aggregates, without reaching their objective of connecting to the water flowing through the river.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4 in Chapter 2 of the EIS**.

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study** presented in **Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than

sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation**

equilibrium" (AGU.06.01), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted.

It can be concluded that the Maipo River system can be managed such that, with the project operations, present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them.

Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

Remark N° 336 Riverbed Erosion

The lack of water flow will bring about the degradation of the aggregates that form the beds of the rivers and streams that flow together to form the "Maipo", which will further aggravate existing problems in bridge pilings, such as the Los Morros Bridge.

This will exacerbate existing damage in the intakes of irrigation channels, which are currently suspended due to the effects of global warming.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4 in Chapter 2 of the EIS**.

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (AGU.06.01), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted.

It can be concluded that the Maipo River system can be managed such that, with the project operations, present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them.

Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

Remark N° 337 Baseline Study

The Project does not hold concessions for water rights at any abstraction point. The Directorate General of Water concluded that it would not be possible to transfer water rights as insufficient water exists. Given that the project does not hold the water rights that it hopes to use, and that should such rights be granted, the flow rates conceded are as yet unknown, the baseline study is not valid because it is based on suppositions regarding flow rates.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS.**

This section presents information characterizing the basins and tributaries of the Volcán, Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the

environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex

13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS.**

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at

least in part.

Remark N° 340

Impact on Production Activities:: Tourism

What plans exist for the mitigation of the impact that the project shall cause for tourists during the operations phase, through increases in journey times or increased waiting periods at intersections? The project owner should calculate the percentage of Santiago residents who regularly visit the Maipo Valley and who shall stop visiting as a result of annoyances caused by the project - and thus, the number of persons engaged in tourist-related commerce in the area who will suffer damage to their livelihood through this reduction in visitor numbers, through sale of local baked goods, picnics, the restaurant industry, etc.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term

mutually beneficial relationships between the project and its surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **TUR Tourism**

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfa, Aucayas, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions. The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS**.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the

spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, roadworks, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

VIA.03 Congestion

When PHAM Project construction activities begin, there will be an increase in road traffic movements in the immediate surroundings of the work area. This vehicle movement will be related mainly to the transport of supplies and machinery to the works installations, transport of excavation spoil to muck deposition sites, and, to a lesser extent, the transport of personnel to the work sites. For more information on traffic flow increases resulting from the Project, see **Chapter 2, section 2.4.1, part E, Annex 14 of the EIS, and Annexes 9 and 14 of Addendum 1.**

The PHAM highway impact analysis takes into account all works and activities under the Project, including the transport of supplies, machinery, and personnel. According to modeling studies, it is predicted that there will be no significant impact on highway usage (levels of saturation of new and existing roads and intersections). For more information on the Project's road operations, measurements used and models derived, see **Annexes 9 and 15 of the Addendum.**

Additionally, increases in noise emissions are analyzed in **Section 6.4.1.2 of the EIS.**

Notwithstanding the above, it is assumed that, given that certain construction activities shall be conducted at the same times that other road users wish to make use of certain sections of specific roads, a certain level of annoyance may be caused, and for this reason the PHAM has adopted a number of control and mitigation measures, indicated in **Chapters 6 and 2 of the EIS** and in **Annex 14 of the EIS, as well as Annexes 9 and 17 of Addendum 1.**

It is considered likely that, in view of the predominance of the tourist industry in the local economy of the district of the Maipo Valley, a certain level of annoyance may be caused at certain points and at specific moments, mainly due to conflicts between PHAM road usage and the movements of visitors. As indicated in the EIS Baseline Study, this is an area where tourists come to enjoy walks and peace and quiet, on weekends and holidays. In particular, there are 2 specific tourism attractions located in the same areas as site installations: the El Yeso and the Alto Volcán area, where special measures shall be taken, as specified in **Chapter 6 of the Project EIS.** Additionally, **Annex 32 of the EIS** specifies emergency procedures to be adopted in the event of transport accidents caused by project vehicles.

Remark N° 345

1. Legal Nature of Aguas Andinas, as a Public Utility Service Provider

Aguas Andinas S.A. (alternatively known as Aguas Andinas) is a sanitary public service company, the sole object of which is to produce and distribute drinking water, to collect and dispose of wastewater, and to conduct activities related but this area of business; its main obligation is to provide uninterrupted drinking water and sewerage services (article 35 of Ministry of Public Works Decree with Force of Law 382/88). With regard to the provision of these public services, the authorities have granted the company the corresponding concessions, which enable it to do so under the conditions established under our legal system.

Our system fully specifies the tariff structure applicable to such companies, and also defines procedures for the approval of development plans by the authority. These plans define the works and water resources that such companies must develop in order to comply with their obligations to their users. Thus, necessary infrastructure works for meet demand during a given time frame are key elements to such companies, and these companies are thus under an obligation to take utmost care in the construction, operation, maintenance, and preservation of such assets.

Thematic responses

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1)

Chapter 3 of the EIS provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

Remark N° 346

2. The fact that a project affects access to the sanitary infrastructure constitutes one of the reasons why it must present an EIS

Article 11 of Law 19,300, the Environmental Base Law, stipulates the criteria for a project to be obligated to submit an Environmental Impact Study to the SEIA, rather than an Environmental Impact Declaration. The article in question states:

Article 11.- Projects or activities shall require the preparation of an Environmental Impact Study if they generate or lead to at least one of the following effects, characteristics, and circumstances

- a) Risk to human health, due to the quantity or characteristics of effluents, emissions, or waste;
- b) Significant adverse effects on the quality and quantity of renewable natural resources, including soil, water, and air;
- c) **Resettling of human communities or significant changes in the ways of life or customs of human groups;**
- d) Localization close to a settlement or protected natural resources subject to impact, as well as the environmental value of the area in which they are planned to be implemented;
- e) Alteration of the area's landscape or tourism value, of significant magnitude or duration; and
- f) Alteration of monuments, sites with anthropological, archeological, or historic value, and, in general, sites belonging to cultural heritage.

In order to evaluate the risk indicated in part a) and the adverse effects mentioned in part b), environmental quality and emissions regulations in force will be taken into account. In the absence of such regulations, standards passed in the countries indicated in the regulations will be used. " (emphasis added).

Conversely, Article 4, part 4 of the same law stipulates the following:

"The Environmental Impact Study shall be approved if it complies with environmental regulations and, taking responsibility for the effects, characteristics, and circumstances stipulated in Article 11, proposes appropriate mitigation, compensation, or reparation measures. Otherwise it shall be rejected."

Therefore, the definition of which effects, characteristics, and circumstances merit the presentation of an EIS is a vital part of all environmental impact evaluation processes. If these considerations are not clearly stated, the baseline study for the environmental component to be affected by the project is very unlikely to be conducted (1), and impacts are unlikely to be determined in a suitable manner, if project works cannot be compared to such a baseline study; it will therefore be impossible to propose suitable mitigation, compensation, or reparation measures.

Therefore, the definition of which impacts merit the presentation of an Environmental Impact Study is a vital part of the study itself. The failure to present an adequate description in this regard can fundamentally compromise the approval of the EIS.

In this regard it should be pointed out at this time that the PHAM project's EIS section on environmental impacts does not mention the items that, under the law and corresponding regulations, render the submission of a study mandatory under Article 11 part c). Indeed, the Project Owner indicates that its project may generate or represent the effects, characteristics, or circumstances referred to in parts b), d), e), and f) of Article 11 of Law 19,300, requiring that the EIS must include mitigation, compensation, or reparation measures considered adequate in view of these impacts (2).

In other words, the Project Owner maintains that the project under evaluation does not represent significant risks to the ways of life and customs of groups of people, and the study therefore does not consider mitigation, compensation, or reparation measures, as to do so would make no sense when the project states that such impacts will not arise.

AGUAS ANDINAS does not share this opinion, in accordance with the arguments presented below.

It should be pointed out that articles 4 to 11 of the Environmental Impact Evaluation System Regulations provide a run-down of the reasons, under Article 11 of Law 19,300, that require the application of this system through the presentation of an Environmental Impact Study (EIS). Specifically, Article 8 of the Regulations specifies the application of Article 11 part c) of the Law. *"Article 8.- The Project Owner must present an Environmental Impact Study if its project or activity leads to the resettling of human communities, or significant changes in the ways of life or customs of human groups."*

In order to evaluate whether the project or activity generates the resettling of human communities, attention will be paid to the displacement or relocation of human groups inhabiting the area of influence of the project or activity, including associated actions and/or works.

The category of human communities or human groups should be understood to refer to all collections of persons who inhabit a territory in which they interact on a permanent basis, giving rise to a way of life comprising social, economic, and cultural relationships that eventually tend to create traditions, community interests, and feelings of belonging.

Furthermore, in order to evaluate whether the project or activity will lead to significant impacts on ways of life and customs of human groups, consideration will be given to changes arising in the following aspects, which together characterize such ways of life:

- a) *geographic aspects, consisting of the distribution of human groups in the territory and the spatial structure of their relationships, taking into account the spatial distribution and density of the population; the size of properties, and land holding; and communications and transport flows;*
- b) *demographic aspects, consisting of local population structures by age, sex, employment/activity, employment category, and migration status, taking into account the urban and rural structure; structure by employment activity and category; economically active population; structure by age and sex; levels of school completion and educational attainment; and migration;*
- c) *anthropological aspects, taking into account ethnic characteristics and expressions of culture, such as religious ceremonies, pilgrimages, processions, celebrations, festivals, tournaments, fairs, and markets;*
- d) *socio-economic aspects, taking into account employment and unemployment; the presence of production activities that depend on the extraction of natural resources by the group of persons, individually or collectively; and*

goods, equipment, and services, such as housing, transport, energy, health, education, and sanitary services. (emphasis added)

Thus, in order to evaluate whether a project will have a significant impact on the ways of life of a group of persons, weighting should be applied depending on whether the project in question will generate changes in the areas known as basic social welfare, which include access to sanitary services. In our opinion, this impact can arise in two different ways: one is when a group's future access to such services is impeded; and the other is when a change may arise through any mechanism affecting sanitary services to which the group currently has access. If such access is affected in any way, this will be a fact that must be evaluated, and if such an impact arises, the project must propose suitable mitigation, compensation, or reparation measures. Otherwise, the project should be rejected.

The inclusion of this consideration of basic social welfare within the content of material affecting the human group, which must be analyzed within an EIS, is in keeping with the definition of "Environment" contained in Law 19,300 itself, which indicates:

"II) Environment: the overall system comprising natural and artificial elements, physical, chemical, or biological in nature, or socio-cultural elements, and the interaction between all of the above, subject to permanent modification through human or natural influences and the development of all different forms of life;"

Thus, as the definition of Environment used is broad, incorporating the natural and artificial elements that govern and define conditions for the existence and development of life, it clearly includes progress achieved in matters of infrastructure, particularly sanitary infrastructure, which permits a society to obtain water - such as to reduce rates of illnesses related to lack of access to drinkable, treated water - and to dispose of wastewater for treatment and final disposal in a manner that prevents disease among the general population. Although this factor appears obvious, it represents a tremendous advance made by nations, and in the area of wastewater treatment it remains a work in progress in Chile.

It is for this reason that the fact that intervention under a project may affect our sanitary services constitutes a reason for the project to be required to obtain approval in the Environmental Impact Study process, with all of the aforementioned consequences applying.

(1) With regard to Article 12, part f) of the Environmental Impact Evaluation System Regulations, it is stipulated that: " f) The baseline, which must describe the area of influence of the project or activity in order to be able to evaluate subsequent impacts that may arise or be observed affecting elements of the environment.

The area of influence of the project or activity must be defined and justified, for each environmental element defined, taking into consideration the potential environmental impacts that could affect these elements.

Environmental elements located within the project or activity's area of influence that give rise to an obligation to present an Environmental Impact Study must be described, taking into account the effects, characteristics, and circumstances referred to in Article 11 of the Law, notwithstanding the further stipulations made in the following article."

(2) It should be born in mind that it does not seem reasonable for the Project Owner to have omitted reference to flow rates arising through part c) of Article 11 of Law 19,300, when it also failed to cover this point in the previous study that it presented to the SEIA, and this omission was one of the objections that led to the need for the project to be reformulated. In view of the project's location in an area where Aguas Andinas possesses a substantial part of its sanitary infrastructure, it was vital that at this time, and in view of the modified project, that this analysis be conducted - an issue that was omitted.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order

to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.05 Drinking water supply**

Construction works and/or activities involved in the project (roads, movement of materials, transport of different products, etc) shall have no effect or impact whatsoever on the quality or security/safety of water supply in the Maipo River system. During the construction phase, Project interventions affecting watercourses shall cause only temporary effects resulting from Earth moving during excavation and other construction activities. This intervention shall affect small areas over short time periods, as it shall last only during the period while these installations are under construction (see **Section 6.4.1.4 of the EIS and Section VII, Question 17, in the Addendum**).

During operations, the PHAM shall not affect the Laguna Negra-Lo Encañado and El Yeso Reservoir system, which is managed by the company Aguas Andinas S.A, in its capacity as holder of the drinking water concession for Santiago; nor shall the Project affect the operational dynamics of the drinking water supply system. Therefore, the implementation of the PHAM does not imply any impact whatsoever on the supply of drinking water (see **Section I, responses 27 and 29, in the Addendum**).

Furthermore, the water abstracted by the Project shall be returned to the river 5 km upstream of the Toma Independiente or Independent Intake, operated by the company Aguas Andinas S.A., which abstracts water for drinking water supply to the city of Santiago; therefore, the PHAM shall not affect normal operations of this system. The PHAM shall only affect the delivery point of water in the tributaries of the Maipo River; in other words, water that currently does not drain into the Maipo River shall not be incorporated into that river's total flow.

However, in the event that an incident may arise as a result of an accident during construction, such as accidental spillages or rockfalls, the procedures described in the Contingency Plan shall be implemented, consisting of a suite of actions to solve associated problems. This plan is explained in detail in **Chapter 7 of the EIS, Section 7.2.5**.

AGU.05.01 Drinking water quality

The process of hydroelectric power generation does not affect the physical/chemical qualities of water. Additionally, the PHAM does not plan to implement regulation installations that retain sediment. Thirdly, downstream of the discharge point the natural river conditions are maintained with regard to flow rate and physical/chemical properties.

During the construction of installations to be located in watercourses, the free-flowing course of the river is maintained through the construction of diversions through pipes laid along the river course for such purposes, or through channels that divert all flow, allowing free water circulation with no effect whatsoever on quality (see **Section I, Question 28, in the Addendum**).

The Project owner shall not make use of the Lo Encañado Lake or water usage rights owned by Aguas Andinas S.A. for this Project, instead opting to forgo usage of these resources and to replace the role that would have been fulfilled by the Lo Encañado Lake with a forebay located on a widening of the Alfalfal II plant headworks, located in the Alto Aucayes area on the Colorado River Valley (for details, see **EIS 2.2.1**). The Lo Encañado area shall be assigned a status of controlled access area at all times: it shall not be subject to any intervention whatsoever. The Project Owner has made available a Water Quality Monitoring Program, with specifications for application during both the construction and operations phases. This program espouses a commitment to verify the effectiveness of environmental control measures designed to minimize the effects of works construction activities during the construction phase.

For further information on the Monitoring Program, see **Sections 8.2 and 8.3** in

Chapter 8 of the EIS.

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled,

the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites

- of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a “restricted zone” with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project’s paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- production of cultural information material
- creation of a viewpoint
- fossil trail

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District’s high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM’s natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project’s environmental management activities will prevent it from causing a reduction in the area’s environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents’ quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the “Human Environment” of the settlements that are located within the PHAM’s area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population’s social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project’s transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area’s constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfafal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **PRO.02 EIS Additional and Complementary Information**

In accordance with consultation procedures conducted by oversight services, further studies and information have been incorporated into Addendum 1, which complements existing information provided in the EIS. Regarding ecological flow rates (**Annex 17**), cultural heritage (**Annex 14**) and the management of summer grazing areas (**Annex 6**).

RSG Risk

The Project Owner possesses a general risk prevention strategy that imposes certain measures on the Project during its different stages of advance. This strategy features the following components:

- a) Measures incorporated into the Project's engineering design.
- b) Systematic verification of compliance with applicable regulations
- c) Establishment of restricted areas
 - c.1) Area restricted due to their archeological, paleontological, or heritage value
 - c.2) Area of natural value that requires protection by the Project
 - c.3) Officially protected area.
- d) Expert supervision during construction
- e) Training regarding environmentally sensitive issues
- f) Internal risk management and accident prevention programs
- g) Separation of works installations and encampments

For further information on each of these points, please see **Chapter 7 of the EIS**, which specifies the **Environmental Management Plan**, the **Risk Control and Prevention Plan** designed for the Project, the safety measures to be adopted in light of the risks identified, and, finally, the **Accident control plan**, to be activated in the event of the failure of the preventive measures taken by the Project Owner. Furthermore, **Annex 32 of the EIS** presents the **Risk and Contingency Prevention Plan** for contractors.

SLD Health Impact

The Project owner shall take responsibility for ensuring compliance with health and safety regulations, in order to prevent any possible risk to health and physical integrity for the inhabitants of San José Maipo as well as the persons working on the Project.

SLD.02 Atmospheric

Although the Project involves surface construction activities, which will lead to the emission of particulate matter, plans call for the implementation of a suite of mitigation measures that will result in a considerable reduction in emission, not only of the PHAM itself but also as against the baseline of current particulate emissions through the Project's area of influence. In addition to the above, these considerations should be evaluated bearing in mind the fact that most of the Project's works will be underground, not producing any emissions of particulate matter.

Conversely, given that most of the Project's works are to be located in high mountain areas, it can be stated that the prevailing ventilation conditions in this environment will facilitate the dispersion of dust, with a natural reduction in emissions during the winter season as a result of the additional moisture contributed by rain and snow precipitation.

For more information on emissions compensation measures, see **Annex 5 of the EIS**.

SLD.02.01 Pollutants

The Project's atmospheric emissions will correspond to dust suspended in the air as a result of

earth moving activities (during excavations, loading and unloading, etc.), and the movement of vehicles at surface work areas. Emissions control will be conducted by means of:

- conservation of existing roads currently used by mine trucks,
- all new roads built will be treated with bischofite. Additional information provided in Section I, Question 42 and Section VI, Question 17, in the Addendum.
- use of tarpaulins covering truck loads,
- timely mechanical maintenance of equipment, machinery, and vehicles, and wetting of dusty surfaces
- use of wagons and belt conveyors for the removal of muck from within tunnels, and similar.

The Project Owner has conducted three studies to estimate emissions, which are included in Annexes 4 and 5 of the EIS. These studies describe the analysis of estimates of atmospheric emissions caused by the PHAM, as well as the Emissions Compensation Program. The study identifies the Project activities that generate emission, quantifies the amount of emissions thus produced, estimates the quantity of emissions for each pollutant during each year of the construction phase, and, finally, develops the Project's emissions compensation program.

SLD.02.02 Traffic contamination

With regard to estimated vehicle traffic and consequent impacts affecting the local population, the study of noise emissions (Addendum, Section VI, Question 36) analyzes predicted effects of traffic by mobile noise sources, leading to a prediction that there will be no noise impacts on persons located closest to the road (EIS, 6.4.1.2).

Conversely, the emission of particulate matter associated with vehicle traffic are insignificant, and plans call for the implementation of a suite of mitigation measures that will result in a considerable reduction in emissions, not only by the PHAM itself but also as against the baseline of current particulate emissions through the Project's area of influence. In addition to the above, these considerations should be evaluated bearing in mind the fact that most of the Project's works will be underground, not producing any emissions of particulate matter.

SLD.03 Acoustic

In the field of Environmental Impact, specifically acoustic impact, the Project Owner has conducted a wide-ranging study to estimate acoustic emissions generated during the construction of the PHAM. For more information on the acoustic impact of the PHAM, and methodologies, modeling techniques, and actions to be taken to minimize such impact, please see **Annex 30 of the EIS** and **Section II, Question 8 in the Addendum**.

Plans for blasting activities, specifically including the frequency, quantity, timing, and work periods of blasting, will be determined on site in accordance with the characteristics of each works activity and work site. Regarding works activity scheduling, priority will be placed on completion of surface works during the daytime (8:00-21:00 hrs.); for blasting activities, plans call for an information program at the time of the activity, defining and clarifying the periods when noise-producing activities will take place, in order to integrate the community into efforts towards the completion of the Project.

Another point worthy of emphasis is that the work sites (tunnel excavation, access windows, and entrances/exits) will not be sited close to settlements, thus preventing most of the potential acoustic impact that could be caused by the PHAM.

Wildlife rescue will be conducted through animal rescue activities based on the trapping of reptiles and amphibians before explosives are used, before service tracks are built, and before the modification of river flow.

Finally, and in order to comply with the requirements set forth above, the Project Owner shall be subject to:

1. Supreme Decree 146 (Establishing Standards on the Emission of Nuisance Noise Generated by Fixed Sources) establishing maximum permissible sound pressure levels, corrected according to technical criteria to evaluate and classify nuisance noises generated by fixed sources affecting the community, such as industrial, commercial, leisure, and artistic activities.
2. Exempt Decree 130 (Establishing restrictions on the movement of cargo trucks). The movement of trucks larger than 4 tons will be suspended from 14:00 hours on Saturdays through to midnight on each Sunday night on Route G-25 and Route G-421.

For more information on the acoustic impact of the PHAM, and regulations (Chapter 6 of the EIS), mitigation measures, methodologies, modeling techniques, and actions to be taken to minimize such impact, please see Annex 30 of the EIS, as mentioned above.

Finally, in order to verify the effectiveness of the mitigation measures taken, noise monitoring will be conducted at 8 sensitive points, following the procedure established in MINSEGPRES Supreme Decree 146/97, in order to verify compliance with the maximum permitted limits for sound pressure level (see details in **Chapter 8 of the EIS, Section 8.2.2**).

SLD.05 Exposure to electromagnetic fields

As has already been mentioned, the Project's electrical layout design is a topic that is not described in this EIS, as the scope of this Study does not cover such installations.

In parallel with the presentation of the EIS for approval by the SEIA, the Project Owner is simultaneously engaged in the preparation of the basic engineering studies for the electrical layout design that will allow the Project to be connected to the SIC Central Grid. To date no definitive plans exist for the electrical connection layout, but it is still relevant to point out that:

1. In view of the project's location, close to Santiago, it is expected that the distance covered by the definitive cabling layout will be short, involving a minimum of sectors not subject to prior intervention.
2. With regard to the specific location of the cabling layout, plans call for the use of the existing high tension power line used by the Queltehues, Volcán, and Maitenes Plants.
3. According to existing scientific background information, no conclusive evidence current exists showing that electricity transmission systems cause harmful effects through radiation. This assumption is therefore ruled out.
4. Once the layout of the high tension power line has been defined, the Project Owner will submit this plan to the Environmental Impact Assessment System, in accordance with legislation in force.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities

Remark N° 347

3.- AES Gener has re-submitted the "Proyecto Hidroeléctrico Alto Maipo" hydroelectric project, Hereinafter PHAM, for Environmental Impact Evaluation

AES Gener has re-submitted a project consisting of the construction of two hydroelectric power plants with a total installed power of 531 MW, to be constructed in the Upper Maipo Valley, for environmental evaluation - with certain modifications as against the prior submission of the original project.

It must be born in mind that the Maipo River system contributes 75% of resources used in supplying drinking water to Greater Santiago. Thus, the Upper Maipo hydroelectric project is developed in the same area and interacts with both the sanitary infrastructure and the water resources used in the aforementioned water supply system.

Notwithstanding the rights that may be held by AES Gener in developing its project, during this process it may not affect works, installations, or water rights held by third parties without their specific consent. Although the project avoids the use of the Lo Encañado Lake as a forebay structure, an analysis must be conducted into whether the project, with its current configuration, will substantially affect sanitary services in the Santiago Metropolitan Region - which shall indeed occur, as analyzed in this document.

Despite modifications made since the previous submission, the projects is still obligated to conduct a detailed analysis from the perspective of its environmental impacts. For this reason, it must be requested that the Environmental Impact Study address certain aspects of the project in greater detail, in order to ensure that suitable measures are taken to guarantee that it does not affect sanitary services. Indeed, it is vital that the project and all parties involved refrain from having any effect on the area's sanitary infrastructure and the water rights associated with that infrastructure, as well as the facilities and additional rights that AGUAS ANDINAS holds with regard to the area, all of which items and rights are fundamental for the normal development of the city of Santiago. As will be demonstrated below, this situation is not made clear in the corresponding Environmental Impact Study. If the project fails to fully offset these impacts, through the application of corresponding mitigation, reparation, or compensation measures, then under Article 16 of Law 19,300 the project must be rejected.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4 in Chapter 2 of the EIS**.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.05 Drinking water supply

Construction works and/or activities involved in the project (roads, movement of materials,

transport of different products, etc) shall have no effect or impact whatsoever on the quality or security/safety of water supply in the Maipo River system. During the construction phase,

Project interventions affecting watercourses shall cause only temporary effects resulting from Earth moving during excavation and other construction activities. This intervention shall affect small areas over short time periods, as it shall last only during the period while these installations are under construction (see **Section 6.4.1.4 of the EIS and Section VII, Question 17, in the Addendum**).

During operations, the PHAM shall not affect the Laguna Negra-Lo Encañado and El Yeso Reservoir system, which is managed by the company Aguas Andinas S.A, in its capacity as holder of the drinking water concession for Santiago; nor shall the Project affect the operational dynamics of the drinking water supply system. Therefore, the implementation of the PHAM does not imply any impact whatsoever on the supply of drinking water (see **Section I, responses 27 and 29, in the Addendum**).

Furthermore, the water abstracted by the Project shall be returned to the river 5 km upstream of the Toma Independiente or Independent Intake, operated by the company Aguas Andinas S.A., which abstracts water for drinking water supply to the city of Santiago; therefore, the PHAM shall not affect normal operations of this system. The PHAM shall only affect the delivery point of water in the tributaries of the Maipo River; in other words, water that currently does not drain into the Maipo River shall not be incorporated into that river's total flow.

However, in the event that an incident may arise as a result of an accident during construction, such as accidental spillages or rockfalls, the procedures described in the Contingency Plan shall be implemented, consisting of a suite of actions to solve associated problems. This plan is explained in detail in **Chapter 7 of the EIS, Section 7.2.5**.

AGU.05.01 Drinking water quality

The process of hydroelectric power generation does not affect the physical/chemical qualities of water. Additionally, the PHAM does not plan to implement regulation installations that retain sediment. Thirdly, downstream of the discharge point the natural river conditions are maintained with regard to flow rate and physical/chemical properties.

During the construction of installations to be located in watercourses, the free-flowing course of the river is maintained through the construction of diversions through pipes laid along the river course for such purposes, or through channels that divert all flow, allowing free water circulation with no effect whatsoever on quality (see **Section I, Question 28, in the Addendum**).

The Project owner shall not make use of the Lo Encañado Lake or water usage rights owned by Aguas Andinas S.A. for this Project, instead opting to forgo usage of these resources and to replace the role that would have been fulfilled by the Lo Encañado Lake with a forebay located on a widening of the Alfalfal II plant headworks, located in the Alto Aucayes area on the Colorado River Valley (for details, see **EIS 2.2.1**). The Lo Encañado area shall be assigned a status of controlled access area at all times: it shall not be subject to any intervention whatsoever. The Project Owner has made available a Water Quality Monitoring Program, with specifications for application during both the construction and operations phases. This program espouses a commitment to verify the effectiveness of environmental control measures designed to minimize the effects of works construction activities during the construction phase.

For further information on the Monitoring Program, see **Sections 8.2 and 8.3** in

Chapter 8 of the EIS.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1)

Chapter 3 of the EIS provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

RES Waste

The Project Owner indicates that most waste generated will be produced during the Project's construction phase. Two types of waste will be produced:

- **Solid waste:**
Construction waste such as wood, piping offcuts, rubble, wires, waste packaging, metals, etc.
Domestic waste or waste similar to domestic waste; plant waste such as remains of shrubs, weeds, and smaller quantities of tree waste removed from work sites.
- **Liquid waste:**
Applicable to the following activities: concrete production, washing and preparation of aggregates, and washing of truck chassis and load beds, machinery, and tools. Other liquid waste relates to wastewater from bathrooms, showers, canteens, and other activities conducted within encampments and site installations.
Gener will place strict contractual requirements on Contractors during the construction phase, aiming to ensure suitable management and final disposal of waste. Additionally, contractors and subcontractors shall agree to comply with regulations and oversight actions established by Law, to be applied to all works of this nature. The planned environmental management manual will prevent the occurrence of any pollution events linked to the Project (see **EIS, Annex 18**).

Remark N° 348**4. Sanitary infrastructure installations and water resources owned by Aguas Andinas that could be affected by the project if suitable measures are not implemented, and the manner in which they may be affected:****4.1. Effects on the El Yeso Reservoir.**

The study briefly mentions that the El Yeso Reservoir will not suffer any changes as the project's water intake is to be sited downstream of the reservoir's discharge.

AES Gener should make it fully clear that the development and operation of its project shall not have any influence on the way in which Aguas Andinas currently operates the El Yeso Reservoir and the water resources associated therewith, and that it will table no requests of actions in this regard.

Since the construction of the El Yeso Reservoir, and based on the past conduct of its owner, statements issued by the authorities, and water usage rights held by Aguas Andinas, the Upper Maipo hydroelectric project may make use of water flow only inasmuch as the dam regulator permits water to flow through the system, with Aguas Andinas remaining subject to no restriction in this regard.

The water flow regulated by the El Yeso Reservoir is subject to commitments specified in the development plans that the Company has filed with the Office of the Superintendent of Sanitary Services, which form a significant grounding with regard to the resources held by the Company, and which it must accredit, such as to provide water supply to the areas included in its concession areas with the supply probability guarantees required. In view of the fundamental nature of this issue, which is vital to the water supply security of Santiago, it is vital that, if the project is approved, the RCA demand that the Project Owner make it totally clear that in the operation of the project it shall give precedence to the operation of the El Yeso Reservoir by AGUAS ANDINAS, which precedence shall stand above the Project Owner's own rights and which shall take account of the obligation to guarantee the continuous, safe, clean, and timely supply of drinking water to the city of Santiago.

It must also be born in mind that certain operational situations, such as turbidity, may render it necessary for Aguas Andinas to extract resources from the El Yeso Reservoir directly, and to transport said resources to its treatment plants using special or existing aqueducts (Laguna Negra). This possibility, which is currently the subject of an engineering study by Aguas Andinas, becomes all the more relevant when one takes into consideration the recent events that arose as a result of the intense rainfall experiences by the area during last May, and that as a result of turbidity in the Maipo River, it was necessary to suspend drinking water service in certain districts of Santiago for several hours. Depending on the results of the technical-economic analysis in progress, Aguas Andinas may decide to implement this solution, which will guarantee the uninterrupted supply of drinking water to Greater Santiago regardless of the turbidity conditions of the Maipo River. This right, held by Aguas Andinas and linked to its obligation to guarantee the supply of drinking water to Greater Santiago, is not subject to modification arising through the implementation of the PHAM.

Specifically, the issues that we consider to be explicitly within the remit of the PHAM RCA are as follows:

- a) The project must not interfere with the operation of the El Yeso Dam and Reservoir, implemented by Aguas Andinas, understood to include the collection, regulation, and discharge of water, in accordance with the needs of that company as holder of the sanitary public service utility concession.
- b) The operation of the project currently under evaluation shall be subject to the operating requirements of the El Yeso reservoir, conducted by Aguas Andinas as holder of the sanitary public service utility concession. In this regard, the safe, continuous, timely, and clean supply of water under the aforementioned concessions may under no circumstances be affected, interrupted, or restricted as a result of the operation of the Project.
- c) Thus, Aguas Andinas may use the resources held in the reservoir in whatever manner best complies with its social objective, including discharging all inflow, as occurs currently, or in the future extracting water directly from the reservoir and transporting it through aqueducts to its intakes or treatment and consumption centers.
- d) The project shall only make use of water flow in the Yeso River that is discharged by Aguas Andinas from the reservoir at its discretion, in accordance with its operational requirements. Thus, the project shall remain subordinate to the effective flow rates through the exit of the El Yeso Reservoir, as a consequence of the purpose of the water regulation dam, in satisfying the requirements of the usage of water consumption rights held by Aguas Andinas.

4.2. Effects on the continuity of sanitary services in the Metropolitan Region.

The discharge flow from the Las Lajas plant, with a maximum flow rate of 65 m³/s, constitutes an extraordinarily significant flow that may alter flow dynamics in the Maipo River.

The effect of the water flow capture and return system, and its operational management, will mean that under certain circumstances and for specific time periods, associated with delays in the transfer of water from its point of origins to the Aguas Andinas intakes, may lead to a shortfall in water resource availability that renders it impossible to cover demand by Aguas Andinas clients, leading to supply shortages in the city of Santiago. Simply from reading the EIS, it emerges that this event may occur during situations of plant startup, maintenance, or contingency events in the Upper Maipo Hydroelectric Project, as well as, potentially, in the event of other situations not included in the project documentation and that may emerge once the detailed operational plans for the hydroelectric plants become known.

This may occur, for instance, during the filling of the 70 km of channels, tunnels, surge chambers, forebays, etc. During such periods, water flow in the watercourses leading into the intakes may suffer reductions that significantly affect the continuity of sanitary services as a result of flow rate reductions in drinking water.

Similar situations may arise in the event of a contingency scenario whereby the hydroelectric plants suddenly close their intake valves, thus ceasing to supply a flow of water downstream of their spillways, or during regular maintenance periods. In this event, it will cease to be possible for water abstraction to continue at the plants' intakes, which are located many kilometers upstream, thus rendering it necessary for this water to return to circulation through natural watercourses, covering the full distance between the PHAM intakes and the Aguas Andinas intakes,

resulting in a temporary reduction in available flow rates that may affect the continuity of sanitary services.

Another aspect not evaluated in the documentation related to the description of the project, wherein it is mentioned in passing that a surge chamber stoplog will exist, which may

water held by the Project Owner are instream and not end-user, and may not affect valid rights held by third parties. Furthermore, it must be taken into account that at all times these plants have been presented as run-of-the-river, not affecting water flow rates in the river. Therefore, if the project is approved, the Project Owner must demonstrate that the river's hydraulic dynamics will not be affected.

None of these considerations is analyzed in the PHAM EIS, and therefore impacts on sanitary services in the Metropolitan Region are overlooked, and no suitable mitigation, compensation, or reparation measures are proposed.

In view of the above, the Project Owner should clarify the aforementioned issues.

4.3. Impact on water quality and sanitary service infrastructure.

In the baseline study section, in the description of the Yeso River, in the description of "Water Resources", the Project Owner makes no statement beyond the following: "The three bodies of water described (Laguna Negra, Laguna Lo Encañado, and El Yeso Reservoir) are considered to be the reserve of drinking water for Santiago, administered by Aguas Andinas."

Further on in the documentation, in the section on the "Built Environment", a tangential reference is made to drinking water supply, with regard to which it is stated that "key water abstraction facilities are located on the Maipo, Yeso, and Volcán River watercourses". In other words, the baseline of the project recognizes, albeit only in general terms, the significance of this hydrological system in the normal supply of drinking water for the Metropolitan Region.

Notwithstanding the above, there is no correlation in the identification of environmental impacts associated with the project, or in mitigation, compensation, and reparation measures proposed; this situation should immediately be amended and clarified by the Project Owner.

In the identification, prediction, and evaluation of the environmental impacts and risk situations associated with the project, the Project Owner indicates that the construction phase will lead to an impact on water resources, arising as a result of the "temporary modification of watercourses and/or water quality during the installation of works, wastewater points, and subsequent return to the natural water flow situation." It is clear that this impact may be of high relevance in terms of water quality, and yet the Project Owner classifies it as negative but of "low significance". In view of the above, the Project Owner should provide a detailed description of the areas of watercourse or adjacent to watercourses that shall be subject to intervention, and the measures to be taken to offset possible impacts on these watercourses that may affect the normal supply of drinking water.

In the plan for mitigation, compensation, and reparation measures related to the construction phase, the Project Owner agrees to "minimize the temporary modification of watercourses and/or water quality", whereby together with temporary management measures

(prioritization of works in watercourses during summer and early fall), it adds the following final paragraph. "It should be underscored that PHAM works shall not affect or result in risk to the installations of Aguas Andinas". This generic statement, viewed from the perspective of the poor background information provided in the Environmental Impact Study, is completely groundless and clearly insufficient to address the risks that the project may generate, given the vagueness of its descriptions and the manner in which it indicates the impacts associated with Aguas Andinas; this situation should be rectified.

With regard to the operations phase, in the section on water, an impact is identified in terms of "the reduction in flow rate in certain stretches of the tributaries of the Maipo River that will lead to an effect on sediment transport dynamics", which is clearly relevant to the operations of Aguas Andinas and for the normal supply of drinking water. Nonetheless, once again the Project Owner classifies this impact as negative but of "low significance"; a statement that is contradicted by the characteristics of the installations owned and operated by Aguas Andinas in this area. It is therefore vital that the Project Owner must conduct a quantitative evaluation of these impacts, above and beyond the merely qualitative assessment presented.

Any removal of rocks or materials, on a massive or even a small scale, may affect the infrastructure owned and operated by Aguas Andinas. It is therefore vital that the environmental impact study baseline documentation take into account the existence of sanitary infrastructure that may be affected by these activities.

The relevance of this issue becomes clear when it is stated in the EIS that 2.7 million cubic meters of material will be removed, and the tunnels alone will remove 1.7 million cubic meters - the site of final disposal of which is not indicated in detail. The same situation arises with regard to TBM muck, regarding which the EIS does not contain precise information and which clearly may have a significant impact on watercourses and clean water reserves held by Aguas Andinas in the area. The Project Owner is therefore requested to conduct and present an analysis of the location of the muck disposal heaps and their technical design, as well as information on stability, in view of these considerations.

In turn, the existence of encampments, the works to be conducted, and the deposition of waste material extracted during such works, are issues that include a series of elements necessary for their implementation - and yet the minimization of any possible impact on the supply of drinking water for Santiago is not considered amongst criteria evaluated - this should be rectified.

The project documentation makes no mention of the operational situations in the hydroelectric plants that will lead to changes in the system's hydraulic dynamics. This could result in the diversion of highly significant flows of water into natural watercourses, and modification or damage affecting the installations owned and operated by Aguas Andinas.

For this reason, project documentation regarding the operations phase of the project should analyze possible water hammer effects that could affect the installations owned and operated by Aguas Andinas.

In documentation on construction works, no mention is made of contingency plans for application in the event of an accident during construction that could affect water quality (such as contamination with hydrocarbons accidentally spilled into a watercourse) or quantity (such as an accident affecting water supply through damage to installations owned and operated by Aguas Andinas).

In view of the above, and the possible interference that may occur during the construction phase of the project, as well as operations, maintenance, and potential contingencies affecting the infrastructure and operations of Aguas Andinas, it is vital that a system of coordination exist between the two companies - this should be a requirement stipulated by the authorities in the Environmental Qualification Resolution (RCA) if the project is approved.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with

the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.05 Drinking water supply

Construction works and/or activities involved in the project (roads, movement of materials, transport of different products, etc) shall have no effect or impact whatsoever on the quality or security/safety of water supply in the Maipo River system. During the construction phase, Project interventions affecting watercourses shall cause only temporary effects resulting from Earth moving during excavation and other construction activities. This intervention shall affect small areas over short time periods, as it shall last only during the period while these installations are under construction (see **Section 6.4.1.4 of the EIS and Section VII, Question 17, in the Addendum**).

During operations, the PHAM shall not affect the Laguna Negra-Lo Encañado and El Yeso Reservoir system, which is managed by the company Aguas Andinas S.A, in its capacity as holder of the drinking water concession for Santiago; nor shall the Project affect the operational dynamics of the drinking water supply system. Therefore, the implementation of the PHAM does not imply any impact whatsoever on the supply of drinking water (see **Section I, responses 27 and 29, in the Addendum**).

Furthermore, the water abstracted by the Project shall be returned to the river 5 km upstream of the Toma Independiente or Independent Intake, operated by the company Aguas Andinas S.A., which abstracts water for drinking water supply to the city of Santiago; therefore, the PHAM shall not affect normal operations of this system. The PHAM shall only affect the delivery point of water in the tributaries of the Maipo River; in other words, water that currently does not drain into the Maipo River shall not be incorporated into that river's total flow.

However, in the event that an incident may arise as a result of an accident during construction, such as accidental spillages or rockfalls, the procedures described in the Contingency Plan shall be implemented, consisting of a suite of actions to solve associated problems. This plan is explained in detail in **Chapter 7 of the EIS, Section 7.2.5**.

AGU.05.01 Drinking water quality

The process of hydroelectric power generation does not affect the physical/chemical qualities of water. Additionally, the PHAM does not plan to implement regulation installations that retain sediment. Thirdly, downstream of the discharge point the natural river conditions are maintained with regard to flow rate and physical/chemical properties.

During the construction of installations to be located in watercourses, the free-flowing course of the river is maintained through the construction of diversions through pipes laid along the river course for such purposes, or through channels that divert all flow, allowing free water circulation with no effect whatsoever on quality (see **Section I, Question 28, in the Addendum**).

The Project owner shall not make use of the Lo Encañado Lake or water usage rights owned by Aguas Andinas S.A. for this Project, instead opting to forgo usage of these resources and to replace the role that would have been fulfilled by the Lo Encañado Lake with a forebay located on a widening of the Alfalfa II plant headworks, located in the Alto Aucayes area on the Colorado River Valley (for details, see **EIS 2.2.1**). The Lo Encañado area shall be assigned a status of controlled access area at all times: it shall not be subject to any intervention whatsoever.

The Project Owner has made available a Water Quality Monitoring Program, with specifications for application during both the construction and operations phases. This program espouses a commitment to verify the effectiveness of environmental control measures designed to minimize the effects of works construction activities during the construction phase.

For further information on the Monitoring Program, see **Sections 8.2 and 8.3 in Chapter 8 of the EIS**.

Remark N° 349

5. The study fails to accredit the fact that it will not lead to impacts affecting the drinking water supply system for a major part of the city of Santiago:

Chapter 4 of the EIS presents an analysis of pertinence, establishing the reasons for presenting an EIS for this project. As already indicated, this chapter does not indicate that one of the reasons for presenting the EIS relates to impacts on ways of life for a human group or community, specifically through leading to modification in access by such groups to sanitary services. In accordance therewith, the study does not feature a detailed baseline analysis of the different components of sanitary infrastructure that may be affected. In general, and as indicated above, the EIS fails to take note of the project's effects on the sanitary system for the Metropolitan Region.

This makes no sense for a project that is to be located in the headwaters of the main drinking water reservoir for the largest city in the country, and implemented alongside a system used by the sanitary service utility provider in supplying drinking water to our capital city - furthermore, in the re-submission of the project proposal which, although amended, refers to the same project as before.

In view of the above, the study here presented fails to evaluate impacts on sanitary infrastructure, and what is more, it is unable to propose adequate mitigation, compensation, or reparation measures. The PHAM is therefore requested to incorporate these issues, to evaluate these impacts, and to propose corresponding mitigation, compensation, or reparation measures; if such expansions are not added, it is requested that this project be rejected.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.05 Drinking water supply

Construction works and/or activities involved in the project (roads, movement of materials, transport of different products, etc) shall have no effect or impact whatsoever on the quality or security/safety of water supply in the Maipo River system. During the construction phase, Project interventions affecting watercourses shall cause only temporary effects resulting from Earth moving during excavation and other construction activities. This intervention shall affect small areas over short time periods, as it shall last only during the period while these installations are under construction (see **Section 6.4.1.4 of the EIS and Section VII, Question 17, in the Addendum**).

During operations, the PHAM shall not affect the Laguna Negra-Lo Encañado and El Yeso Reservoir system, which is managed by the company Aguas Andinas S.A, in its capacity as holder of the drinking water concession for Santiago; nor shall the Project affect the operational dynamics of the drinking water supply system. Therefore, the implementation of the PHAM does not imply any impact whatsoever on the supply of drinking water (see **Section I, responses 27 and 29, in the Addendum**).

Furthermore, the water abstracted by the Project shall be returned to the river 5 km upstream of the Toma Independiente or Independent Intake, operated by the company Aguas Andinas S.A., which abstracts water for drinking water supply to the city of Santiago; therefore, the PHAM shall not affect normal operations of this system. The PHAM shall only affect the delivery point of water in the tributaries of the Maipo River; in other words, water that currently does not drain into the Maipo River shall not be incorporated into that river's total flow.

However, in the event that an incident may arise as a result of an accident during construction, such as accidental spillages or rockfalls, the procedures described in the Contingency Plan shall be implemented, consisting of a suite of actions to solve associated problems. This plan is explained in detail in **Chapter 7 of the EIS, Section 7.2.5**.

AGU.05.01 Drinking water quality

The process of hydroelectric power generation does not affect the physical/chemical qualities of water. Additionally, the PHAM does not plan to implement regulation installations that retain sediment. Thirdly, downstream of the discharge point the natural river conditions are maintained with regard to flow rate and physical/chemical properties.

During the construction of installations to be located in watercourses, the free-flowing course of the river is maintained through the construction of diversions through pipes laid along the river course for such purposes, or through channels that divert all flow, allowing free water circulation with no effect whatsoever on quality (see **Section I, Question 28, in the Addendum**).

The Project Owner shall not make use of Lo Encañado Lake in this Project, nor shall it make use of the

water usage rights held by the company Aguas Andinas S.A., instead leaving these resources untouched and replacing the role previously occupied by the Lo Encañado Lake with a forebay, which will be located on a widened area corresponding to the Alfalfal II Plant surge shaft, located in the Alto Aucayes area in Colorado River Valley (see details in **EIS 2.2.1**). The Lo Encañado area shall be assigned a status of controlled access area at all times: it shall not be subject to any intervention whatsoever.

The Project Owner has made available a Water Quality Monitoring Program, with specifications for application during both the construction and operations phases. This program espouses a commitment to verify the effectiveness of environmental control measures designed to minimize the effects of works construction activities during the construction phase.

For further information on the Monitoring Program, see **Sections 8.2 and 8.3** in **Chapter 8 of the EIS**.

Remark N° 350 Impact on Production Activities and Users of Sanitary Services

Imbalance in the sedimentological dynamics of the Maipo River caused by a flow stoppage in the large quantity of tunnels and channels involved (approx. 70 km) will bring about a risk affecting a wide range of production activities and users in the Metropolitan Region, such as: sand producers, irrigation users, the Ministry of Public Works, and the company Aguas Andinas.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.05 Drinking water supply

Construction works and/or activities involved in the project (roads, movement of materials, transport of different products, etc) shall have no effect or impact whatsoever on the quality or security/safety of water supply in the Maipo River system. During the construction phase, Project interventions affecting watercourses shall cause only temporary effects resulting from Earth moving during excavation and other construction activities. This intervention shall affect small areas over short time periods, as it shall last only during the period while these installations are under construction (see **Section 6.4.1.4 of the EIS and Section VII, Question 17, in the Addendum**).

During operations, the PHAM shall not affect the Laguna Negra-Lo Encañado and El Yeso Reservoir system, which is managed by the company Aguas Andinas S.A, in its capacity as holder of the drinking water concession for Santiago; nor shall the Project affect the operational dynamics of the drinking water supply system. Therefore, the implementation of the PHAM does not imply any impact whatsoever on the supply of drinking water (see **Section I, responses 27 and 29, in the Addendum**).

Furthermore, the water abstracted by the Project shall be returned to the river 5 km upstream of the Toma Independiente or Independent Intake, operated by the company Aguas Andinas S.A., which abstracts water for drinking water supply to the city of Santiago; therefore, the PHAM shall not affect normal operations of this system. The PHAM shall only affect the delivery point of water in the tributaries of the Maipo River; in other words, water that currently does not drain into the Maipo River shall not be incorporated into that river's total flow.

However, in the event that an incident may arise as a result of an accident during construction, such as accidental spillages or rockfalls, the procedures described in the Contingency Plan shall be implemented, consisting of a suite of actions to solve associated problems. This plan is explained in detail in **Chapter 7 of the EIS, Section 7.2.5**.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics

- of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information

on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998). As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity. It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence. Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area. The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (AGU.06.01), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity. Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence. Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted. It can be concluded that the Maipo River system can be managed such that, with the project operations, present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them. Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

AGU.06.03 Maipo River Sand Production

With regard to the extraction of aggregates in the Maipo River, during the operations phase of the PHAM, the Project will not modify current natural sediment (aggregates) transport dynamics occurring in the river. In effect, under the natural dynamics, sediment transport takes place mainly in the months of November, December, and January, as a result of snow and ice melt in the high mountains, and it is during this season that variations in flow rate in the Maipo River caused by the project stand at their lowest levels. The same behavior applies to winter season rises in river level. It must be pointed out that the PHAM returns water to the Maipo River in the Las Lajas area, located upstream of the El Canelo zone, and therefore downstream of this point the river's flow dynamics with the project shall be identical to those currently observed. It is of great importance to observe that currently, without the PHAM in operation, slightly downstream of the Las Vertientes area (in the La Obra stretch of the river), during certain times of the year flow rate in the Maipo River watercourse drops significantly, leaving the river bed dry, due to water abstraction at the following intakes: La Sirena Channel, San Carlos Channel, Independent Intake owned by Aguas Andinas, etc. Average water abstraction flow rates attributable to the main drinking water and irrigation intakes, many of which also make use of hydroelectric power as a byproduct, but discounting the effects of existing hydroelectric plants on these channels that discharge directly into the intakes, amounts to 113 m³/second, which is equal to the average annual flow rate in the Maipo River at Las Vertientes. Depending on water availability, the annual abstraction rate at these intakes varies between 78 and 164 m³/second. This situation clearly explains the high level of perturbation observed in the behavior of the Maipo River watercourse downstream of Las Vertientes, where the riverbed is dry except during periods of increased water level and in unusually wet years. It is for this reason that the Project Owner asserts that its activities will have no impact on the current situation in the sand extraction sites located on the Maipo River.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district. In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district. During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain

climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing

background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. The study also investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 351

A. REMARKS REGARDING THE ENVIRONMENTAL COMPONENT: WATER

1. A number of motions opposing the project have been filed by third parties regarding requests made by the Project Owner for the transfer of water rights. Therefore, the transfer of rights is by no means guaranteed, as it falls within the remit of the courts to decide on these cases, in accordance with the stipulations of the Water Code. It therefore strikes us as extremely strange that the Project Owner should insist that a project of this type should be approved, as it is not certain that it could be implemented even if approval were granted. With regard to water usage rights already granted in this hydrological system, water shortages currently exist in areas that currently suffer "legal" water shortages, even if effects have yet to emerge as a result of some water rights going unused. This problem may be aggravated by the transfer of water rights requested in the headwaters of the Volcán and Yeso Rivers, with a water abstraction point near the settlements of El Melocotón. Any future transfer of rights upstream of this point will affect the hydrological balance of points that were previously not affected by such potential abstraction. Furthermore, it should be pointed out that historically and traditionally, the local community has used water obtained from small channels to irrigate small market gardens and orchards, for example in the area of El Volcán and Los Maitenes. These persons do not hold legally validated water rights, despite having historically made use of water from the river. What will be the fate of these families? It is also indicated that most of these families have low incomes, and taking away their irrigation water would condemn them to lose the supply sources for their gardens, orchards, and small plots of land. Therefore, this is an effect which the study must not leave unaddressed.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS**.

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights

(available for examination in **Section V, Question 24, Section vi of the Addendum**).

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in **Chapter 2 of the EIS**.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources.

During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability

for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 352

REMARKS REGARDING THE ENVIRONMENTAL COMPONENT: WATER

2. The Project Owner should present a complete study on the functioning of the forebay mentioned in the EIS, in view of the dangers inherent in accumulating 47,000 m³ of water in the upper river basin in the Aucayes area. In this issue, it is vital that the average freeboard is calculated using a method that takes into account not only safety parameters but also wave height, wind speed, and seasonal and local parameters. Additionally, the EIS presented does not contain an operational simulation that includes possible emergency situations, and corresponding contingency plans.

The schematic presented does not include the spillway weir. This element of the system should be designed to handle a situation where the intake flow rate exceeds the output flow rate, indicating where water is discharged, and the environmental impact and risk that may arise as a result of this situation.

With regard to the forebay to be built in the Aucayes Stream Basin, at the Hacienda Río Colorado, the Project Owner does not present a detailed technical proposal or information on variations in the area's natural state resulting from the construction of the forebay, such as impacts on the geological structure of the Aucayes Stream, the basin's hydrological dynamics, and the abundant plant and animal life that exists in the area; similarly, no information is provided regarding the potential risks caused to the environment and local residents as a result of leaks, overload, or overfilling during the operations phase. This information is particularly important in view of the presence of high-value plant communities in the Aucayes Stream system, and the location of the settlement of Maitenes at the base of the stream - in an area that the Project Owner itself defines as a zone of mass flow removal.

In the event of a transient phenomenon, how can the Project Owner guarantee that the forebay will not overflow? For instance, what would happen in the event of the abrupt closure of stoplogs or valves? The Project Owner is reminded that the town of Los Maitenes is located on one bank of the Aucayes Stream, and is in a high risk situations in the event of landslides or flash floods. Furthermore, the Project Owner does not present a detailed study addressing the risk of indirectly affecting surface or underground watercourses through the construction or operations of works in the Aucayes Stream - under which circumstances it should offer a commitment to conducting applicable mitigation actions to maintain ecological flow rates and normal functioning of the Aucayes Stream.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds in-stream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

RSG Risk

The Project Owner possesses a general risk prevention strategy that imposes certain measures on the Project during its different stages of advance. This strategy features the following components:

- a) Measures incorporated into the Project's engineering design.
- b) Systematic verification of compliance with applicable regulations
- c) Establishment of restricted areas
 - c.1) Area restricted due to their archeological, paleontological, or heritage value
 - c.2) Area of natural value that requires protection by the Project
 - c.3) Officially protected area.
- d) Expert supervision during construction
- e) Training regarding environmentally sensitive issues
- f) Internal risk management and accident prevention programs
- g) Separation of works installations and encampments

For further information on each of these points, please see **Chapter 7 of the EIS**, which specifies the **Environmental Management Plan**, the **Risk Control and Prevention Plan** designed for the Project, the safety measures to be adopted in light of the risks identified, and, finally, the

Accident control plan, to be activated in the event of the failure of the preventive measures taken by the Project Owner. Furthermore, **Annex 32 of the EIS** presents the **Risk and Contingency Prevention Plan** for contractors.

RSG.01 Load rejection

During the operation of the power plants, situations may arise that necessitate the stoppage of one or both plants for a certain period of time. Two temporary phenomena occur at such times, the effects of which must be analyzed. These phenomena are mass oscillations within tunnels carrying water under pressure, and impact on the Maipo River system's flow dynamics.

A special situation arises in the operation of a hydroelectric plant when a sudden stoppage occurs affecting its power generation units or discharge spillways. Load rejection can arise as a result of automatic shutoffs caused by internal or external failures:

- Internal. These situations relate to technical problems within the

power plant that require the stoppage of the turbines. This can arise due to

a mechanical failure (valve or turbine failure) or an electrical fault in the mechanisms that operate the generator units, or in the high tension switchgear (switches or power line distributors).

- External. External events can lead to total system failure (black out), which is a less frequent situation. This can be caused by a break in the power transmission line that serves both power plants.

Fortunately, such events are infrequent; by way of illustration, see **EIS Annex 17, Table 3.1**, which shows a summary of load rejections that occurred at the Alfafal Power Plant from 2004 to 2007.

For further information on the analyses taken into account for different potential cases of failures in the power generation units in the Alto Maipo plants, please see **Annex 17 of the EIS and Annex 16 of Addendum 1**.

Remark N° 353

REMARKS REGARDING THE ENVIRONMENTAL COMPONENT: WATER

3. During project startup and any major maintenance stoppage, the project will require an estimated 2,000,000 m³ of water to fill or refill intake works, tunnels, and headworks installations. This volume is equivalent to the end user water rights granted to third parties, which would be affected. Furthermore, during operations, maintenance events may arise whereby the Project shuts down for a set period of time. This situation would lead to a significant drop in flow rate in the Maipo River downstream of the Las Lajas discharge spillway, due to the delay while water would be flowing through its natural watercourses to the intakes of irrigation channels and other water abstraction installations owned by Aguas Andinas and by third parties. Additionally, on plant restart after maintenance shutdowns, 2,000,000 m³ of water will be required to refill the system. Therefore, a complete analysis of proposed effects, uses, and mitigations measures is requested, in order to clarify this situation.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in
**Chapter 2 of the
EIS.**

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources.

During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water,

over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 354

REMARKS REGARDING THE ENVIRONMENTAL COMPONENT: WATER

4. During the Project's operations phase, transient phenomena may occur that give rise to a water hammer effect - for example, closure of valves or sluices, or even mechanical failures. In this area, water hammer effects may occur at intakes, leading to unexpected sudden water flow into watercourses. In fact, background information indicates that this has occurred in the area of the Queltehues Intake and in the Olivares River. This represents a potentially fatal danger to persons happening to be near to the watercourses in question, if they are not warned of the coming water flow in a timely manner. Similarly, a situation of this type would create a risk of killing animals located close to the watercourses, and to goods and real estate or buildings in such locations. AES Gener, does not make clear in its EIS how it will prevent such events, or the protection measures planned for this eventuality. We would like to remind the Project Owner that the Maipo River Valley currently receives more than 1,500,000 Chilean and foreign tourists each year, most of whom visit riverbank and stream bank areas for leisure activities - the physical and mental health of these visitors will be placed in grave danger in the event of the occurrence of the situation described above. This issue is of particular significance during the high season for tourism, when thousands of people can gather on the banks of the watercourses subject to intervention at a given point in time.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a

reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as

those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **RSG Risk**

The Project Owner possesses a general risk prevention strategy that imposes certain measures on the Project during its different stages of advance. This strategy features the following components:

- a) Measures incorporated into the Project's engineering design.
- b) Systematic verification of compliance with applicable regulations
- c) Establishment of restricted areas
 - c.1) Area restricted due to their archeological, paleontological, or heritage value
 - c.2) Area of natural value that requires protection by the Project
 - c.3) Officially protected area.
- d) Expert supervision during construction
- e) Training regarding environmentally sensitive issues
- f) Internal risk management and accident prevention programs
- g) Separation of works installations and encampments

For further information on each of these points, please see **Chapter 7 of the EIS**, which specifies the **Environmental Management Plan**, the **Risk Control and Prevention Plan** designed for the Project, the safety measures to be adopted in light of the risks identified, and, finally, the **Accident control plan**, to be activated in the event of the failure of the preventive measures taken by the Project Owner. Furthermore, **Annex 32 of the EIS** presents the **Risk and Contingency Prevention Plan** for contractors.

RSG.01 Load rejection

During the operation of the power plants, situations may arise that necessitate the stoppage of one or both plants for a certain period of time. Two temporary phenomena

occur at such times, the effects of which must be analyzed. These phenomena are mass oscillations within tunnels carrying water under pressure, and impact on the Maipo River system's flow dynamics.

A special situation arises in the operation of a hydroelectric plant when a sudden stoppage occurs affecting its power generation units or discharge spillways. Load rejection can arise as a result of automatic shutoffs caused by internal or external failures:

- Internal. These situations relate to technical problems within the power plant that require the stoppage of the turbines. This can arise due to a mechanical failure (valve or turbine failure) or an electrical fault in the mechanisms that operate the generator units, or in the high tension switchgear (switches or power line distributors).
- External. External events can lead to total system failure (black out), which is a less frequent situation. This can be caused by a break in the power transmission line that serves both power plants.

Fortunately, such events are infrequent; by way of illustration, see **EIS Annex 17, Table 3.1**, which shows a summary of load rejections that occurred at the Alfalfal Power Plant from 2004 to 2007.

For further information on the analyses taken into account for different potential cases of failures in the power generation units in the Alto Maipo plants, please see **Annex 17 of the EIS and Annex 16 of Addendum 1**.

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 355

REMARKS REGARDING THE ENVIRONMENTAL COMPONENT: WATER

5. The Maipo River Sedimentation Study conducted by the Civil Engineering Department at the Universidad de Chile in March 2008, presented by the Project Owner in Annex 20, concludes that the Project can be expected to lead to an average decline in total solid erosion and entrainment of 22%. This figure includes streambed transport and solids in suspension.

The study also concludes: "In view of the absence of integrated management plans for aggregates extraction activities in the Maipo River, annual extraction rates appear to stand at the very limit of the what is sustainable for the watercourse, as deduced for background information reviewed. In this scenario, any perturbation to the system could lead to local riverbed erosion problems, as has occurred in the past due to overextraction during certain periods. Therefore, if the predicted reductions in sediment availability downstream of the Independent Intake implemented by the project come to pass, then although these variations are relatively minor, they may lead to local problems if measures are not taken to ensure more rational management of the watercourse and available water and aggregates resources. This management should clearly be conducted addressing the river basin as a whole, and implemented by the competent authority". It should be made clear that the study presented refers to average values, but that monthly estimates are also necessary. The Project Owner does not adequately address the issue of aggregates. We also find the stance taken by the Project Owner surprising, with regard to the aggregates extraction that it plans to implement itself, as this activity alone requires an EIS (as the equivalent extraction rate is greater than 3,000,000 tons per year), and municipal permits, which have not been obtained by the Project Owner. Additionally, the Project Owner presents no description of predicted effects on the "El Toyo" and "Las Vertientes" bridges, and no specification for its impact on valid aggregates permits currently existing in the area.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study** presented in **Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on

background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (**AGU.06.01**), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted.

It can be concluded that the Maipo River system can be managed such that, with the project operations, present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them.

Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

AGU.06.03 Maipo River Sand Production

With regard to the extraction of aggregates in the Maipo River, during the operations phase of the PHAM, the Project will not modify current natural sediment (aggregates) transport dynamics occurring in the river.

In effect, under the natural dynamics, sediment transport takes place mainly in the months of November, December, and January, as a result of snow and ice melt in the high mountains, and it is during this season that variations in

flow rate in the Maipo River caused by the project stand at their lowest levels. The same behavior applies to winter season rises in river level.

It must be pointed out that the PHAM returns water to the Maipo River in the Las Lajas area, located upstream of the El Canelo zone, and therefore downstream of this point the river's flow dynamics with the project shall be identical to those currently observed.

It is of great importance to observe that currently, without the PHAM in operation, slightly downstream of the Las Vertientes area (in the La Obra stretch of the river), during certain times of the year flow rate in the Maipo River watercourse drops significantly, leaving the river bed dry, due to water abstraction at the following intakes: La Sirena Channel, San Carlos Channel, Independent Intake owned by Aguas Andinas, etc.

Average water abstraction flow rates attributable to the main drinking water and irrigation intakes, many of which also make use of hydroelectric power as a byproduct, but discounting the effects of existing hydroelectric plants on these channels that discharge directly into the intakes, amounts to 113 m³/second, which is equal to the average annual flow rate in the Maipo River at Las Vertientes. Depending on water availability, the annual abstraction rate at these intakes varies between 78 and 164 m³/second.

This situation clearly explains the high level of perturbation observed in the behavior of the Maipo River watercourse downstream of Las Vertientes, where the riverbed is dry except during periods of increased water level and in unusually wet years.

It is for this reason that the Project Owner asserts that its activities will have no impact on the current situation in the sand extraction sites located on the Maipo River.

AGU.06.04 Discharge effects

Water capture in advance of in-situ gravel removal leads first to a reduction in sediment load in water carried through the headworks to the turbine rooms, while the solid materials that is retained is returned to the river. At the point where water is discharged from the plants (Las Lajas area), water that has passed through the turbines - which contains a certain quantity of sediment - once again mixes with the water in the rivers, returning to its original conditions in terms of average sediment load (**Addendum, Section I, Question 28**).

At the point where water is returned to the Maipo River, in the Las Lajas area, there will be no degradation of the riverbed as it is composed entirely of rocks. It should be mentioned that the flow rate discharged from the PHAM at this point is always lower than the flow rate in the Maipo River just upstream.

During the operations phase of the Project, planned maintenance activities do not include any cleaning of tunnels and culverts. Inside the tunnels, the cross sectional area for water flow is small enough to prevent sedimentation. This is shown through the operation of the Alfalfa Plant for 20 years without any cleaning of the tunnels being included among maintenance activities.

The only operations that lead to the discharge of sediment are the discharge of gravel traps at the inlets, and the flushing of the sandtraps, returning sediment to the river once a certain volume has built up within them. These

operations are conducted intermittently and for short time periods (1 minute for sandtraps, 10 minutes for gravel traps), at variable frequency depending on

the season. For more information see the **Addendum, Section IV, Question 3.**

Remark N° 356

REMARKS REGARDING THE ENVIRONMENTAL COMPONENT: WATER

6. The EIS should incorporate expected effects due to climate change, as it is a state policy to take the effects of this phenomenon into account in national planning. The Project Owner is reminded that the "Study on Climate Variability in Chile for the 21st Century", prepared by the geophysics department at the Universidad de Chile's Science Faculty, is classified as an official CONAMA document, and predicts an estimated temperature rise of 2 °C to 4 °C, and an increase in the altitude of the 0 °C isotherm by 300 to 500 m, as against the current climate. The study determines that on a seasonal basis the temperature increase may exceed 5 °C in some high-altitude areas of the Andes, particularly in summer. In terms of precipitation, the study predicts a general decline in the area of Central Chile of the order of 40%, with possible declines of up to 50%. This scenario would lead to a major drop in flow rates in the upper Maipo River basin. We wish to remind the Project Owner that during 2007 the Maipo River had an average flow rate of 126 m³/s, as against a historic average of 207 m³/s, resulting in a 39.1% drop (22 April, 2008, seminar on "The Social and Economic Impact of Drought", Faculty of Agronomy and Forestry Engineering, Pontificia Universidad Católica de Chile).

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that

must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.
To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a

description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

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Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Eastings	Northings
	Alto Volcán		
	406,157		
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 357**REMARKS REGARDING THE ENVIRONMENTAL COMPONENT:
WATER**

7. It is possible that this project may affect groundwater, during both the construction and operations phases.

The Project Owner is requested to comment on this issue. A number of deep wells exist in the district, and these should be mapped and reviewed in terms of potential impacts of the Project.

Thematic responses**AGU Water**

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.03 Underground water

Underground water will not be affected in any way by the operation of the Project. This is the case because the underground water flow capacity in each sector of the aquifer associated with the Maipo River is much lower than the minimum flow running through each section of the river, and therefore under all circumstances the aquifers shall remain saturated. Thus, underground water sources present in the area shall also not be affected.

The PHAM plans to construct 70 km of tunnels, of which approximately 50 km correspond to headworks or hydraulic pressure tunnels, the remainder being access tunnels for use during construction of the project and for subsequent operation of the power plants (see **EIS Chapter 5, Section 5.3.5.3**).

Most of these tunnels have been designed to operate at variable internal pressures, with a maximum achieved at certain points of a little more than 450 m. The design requirement for these tunnels is that the lower limit of principal compression in the surrounding rock medium is always less than the operating pressure, such as to maintain a sufficient safety margin to prevent alterations in natural permeability dynamics through hidrojacking. In areas where this design principle is not guaranteed, the Project plans to install impermeable tunnel linings (**EIS, Annex 45.4**).

During the excavation of these tunnels, it is possible that the work front may have to pass through permeable rock strata - leading to seepages of water into the tunnel, the magnitude of which will depend on the permeability of the rock, the depth of the tunnel, and the level of the water table. In some areas, tunnel wall treatments may have to be applied in order to prevent water transfer into or out of the headworks tunnels.

The Project does not plan to make use of any water seepages that may arise, in the generation of electricity. Additionally, the overarching design principles underpinning the Project are oriented towards limiting seepages during construction, in order to establish suitable conditions for efficient tunnel excavation activities. The same principle applies to methods to limit the infiltration of water from the tunnels into the rock mass, thus avoiding water loss during operations.

Additionally, these procedures guarantee that any groundwater that may intercept the tunnels shall suffer no change in its natural hydrological dynamics, or impact on any foreign components or water other than the water entering the system (**EIS, Annex 45**). Special attention will be paid to the quality and characteristics of any water that may eventually return to the natural water system through the tunnel access windows, and therefore construction contracts will specify measurements that must be made and the treatment that shall be required for subsequent disposal of such water, in order to ensure compliance with the quality requirements for water discharge into natural watercourses, under regulations currently in force.

In the event of seepages of water at high temperature and possible

acidic composition, it is important to make clear that in general there shall be no major differences in the methods used to render the tunnel walls impermeable. During all site surveys conducted, research boreholes and surface geological maps produced to date applying to the areas through which the tunnels will pass, no evidence whatsoever has been found to lead to any prediction of the presence of water at high temperatures, or with mineral or acidic contamination. As additional background information, during the construction of the Alfalfal Plant - with the excavation of 35 km of tunnels - no events similar to those indicated above occurred. Notwithstanding the above, the specification establish that, in locations located close to potentially critical areas, the contractor must drill survey boreholes of between 25 m and 30 m in length ahead of the tunnel work front, in order to gain early warning of seepage problems and thus be able to apply impermeable tunnel wall treatments as required. See **EIS, Annex 45.4.**

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.05 Drought from infiltration of minimum ecological water flow

The Project's potential indirect impact on groundwater in the area of influence has been evaluated in detail in the report attached as **Annex 25 of the EIS**. According to this analysis, all aquifers located throughout the areas of influence will not be affected in any way. This is the case because the underground water flow capacity in each sector of the aquifer associated with the Maipo River is much lower than the minimum flow running through each section of the river, and therefore under all circumstances the aquifers shall remain saturated. Thus, underground water sources present in the area shall also not be affected.

Remark N° 358

REMARKS REGARDING THE ENVIRONMENTAL COMPONENT: WATER

8. The Project Owner is requested to comment on how the decline in flow rates in a major stretch of the Maipo River Basin will affect the receptor water body's dilution capacity. In this regard, attention should be paid to the stretch exposed, due to the large number of nearby settlements, such as Baños Morales, El Volcán, San Gabriel, El Ingenio, San Alfonso; Melocotón, San José de Maipo, Guayacán, and El Manzano, which generate and discharge wastewater and which, conversely, use water from the Maipo River for domestic and recreational purposes, etc. In order to maintain the current sanitary quality of these watercourses, the operating dynamics of existing wastewater treatment plants should be reviewed.

A geographical survey should be plotted, and an analysis of the stretch of the river in question and the expected effects.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in **Chapter 2 of the EIS**.

AGU.05 Drinking water supply

Construction works and/or activities involved in the project (roads, movement of materials, transport of different products, etc) shall have no effect or impact whatsoever on the quality or security/safety of water supply in the Maipo River system. During the construction phase, Project interventions affecting watercourses shall cause only temporary effects resulting from Earth moving during excavation and other construction activities. This intervention shall affect small areas over short time periods, as it shall last only during the period while these installations are under construction (see **Section 6.4.1.4 of the EIS and Section VII, Question 17, in the Addendum**).

During operations, the PHAM shall not affect the Laguna Negra-Lo Encañado and El Yeso Reservoir system, which is managed by the company Aguas Andinas S.A, in its capacity as holder of the drinking water concession for Santiago; nor shall the Project affect the operational dynamics of the drinking water supply system. Therefore, the implementation of the PHAM does not imply any impact whatsoever on the supply of drinking water (see **Section I, responses 27 and 29, in the Addendum**).

Furthermore, the water abstracted by the Project shall be returned to the river 5 km upstream of the Toma Independiente or Independent Intake, operated by the company Aguas Andinas S.A., which abstracts water for drinking water supply to the city of Santiago; therefore, the PHAM shall not affect normal operations of this system. The PHAM shall only affect the delivery point of water in the tributaries of the Maipo River; in other words, water that currently does not drain into the Maipo River shall not be incorporated into that river's total flow.

However, in the event that an incident may arise as a result of an accident during construction, such as accidental spillages or rockfalls, the procedures described in the Contingency Plan shall be implemented, consisting of a suite of actions to solve associated problems. This plan is explained in detail in **Chapter 7 of the EIS, Section 7.2.5**.

AGU.05.01 Drinking water quality

The process of hydroelectric power generation does not affect the physical/chemical qualities of water. Additionally, the PHAM does not plan to implement regulation installations that retain sediment. Thirdly, downstream of the discharge point the natural river conditions are maintained with regard to flow rate and physical/chemical properties.

During the construction of installations to be located in watercourses, the free-flowing course of the river is maintained through the construction of diversions through pipes laid along the river course for such purposes, or through channels that divert all flow, allowing free water circulation with no effect whatsoever on quality (see **Section I, Question 28, in the Addendum**).

The Project owner shall not make use of the Lo Encañado Lake or water usage rights owned by Aguas Andinas S.A. for this Project, instead opting to

forgo usage of these resources and to replace the role that would have been fulfilled by the Lo Encañado Lake with a forebay located on a widening of the Alfalfa II plant headworks, located in the Alto Aucayes area on the Colorado River Valley (for details, see **EIS 2.2.1**). The Lo Encañado area shall be assigned a status of controlled access area at all times: it shall not be subject to any intervention whatsoever.

The Project Owner has made available a Water Quality Monitoring Program, with specifications for application during both the construction and operations phases. This program espouses a commitment to verify the effectiveness of environmental control measures designed to minimize the effects of works construction activities during the construction phase.

For further information on the Monitoring Program, see **Sections 8.2 and 8.3** in **Chapter 8 of the EIS**.

Remark N° 359**REMARKS REGARDING THE ENVIRONMENTAL COMPONENT:
WATER**

9. A number of creeks and streams exist along the entire set of lines to be taken by project water conduits, over the surface and running through tunnels. Depending on the depth of works for tunnel boring, it is impossible to rule out that the bedrock may crack, leading to seepages of water away from the surface and reducing water flow in these watercourses, or leaving them dry.

It should be born in mind that, in the conduit tranches running from the intakes in the Upper Volcán River Basin to the new forebay in the upper reaches of the Aucayes Stream, and from the Las Lajas turbine house to the point of discharge into the Maipo River, the tunnels function as an aqueduct - that is, they will carry water that is not under pressure, and therefore may absorb surface water and groundwater along their entire length.

The Project Owner is requested to identify each of the creeks and streams that may be affected, indicating the depth of the crossing, the rock type, and the working pressure in the tunnel.

Thematic responses**AGU Water**

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03.03 Underground water

Underground water will not be affected in any way by the operation of the Project. This is the case because the underground water flow capacity in each sector of the aquifer associated with the Maipo River is much lower than the minimum flow running through each section of the river, and therefore under all circumstances the aquifers shall remain saturated. Thus, underground water sources present in the area shall also not be affected.

The PHAM plans to construct 70 km of tunnels, of which approximately 50 km correspond to headworks or hydraulic pressure tunnels, the remainder being access tunnels for use during construction of the project and for subsequent operation of the power plants (see **EIS Chapter 5, Section 5.3.5.3**).

Most of these tunnels have been designed to operate at variable internal pressures, with a maximum achieved at certain points of a little more than 450 m. The design requirement for these tunnels is that the lower limit of principal compression in the surrounding rock medium is always less than the operating pressure, such as to maintain a sufficient safety margin to prevent alterations in natural permeability dynamics through hidrojacking. In areas where this design principle is not guaranteed, the Project plans to install impermeable tunnel linings (**EIS, Annex 45.4**).

During the excavation of these tunnels, it is possible that the work front may have to pass through permeable rock strata - leading to seepages of water into the tunnel, the magnitude of which will depend on the permeability of the rock, the depth of the tunnel, and the level of the water table. In some areas, tunnel wall treatments may have to be applied in order to prevent water transfer into or out of the headworks tunnels.

The Project does not plan to make use of any water seepages that may arise, in the generation of electricity. Additionally, the overarching design principles underpinning the Project are oriented towards limiting seepages during construction, in order to establish suitable conditions for efficient tunnel excavation activities. The same principle applies to methods to limit the infiltration of water from the tunnels into the rock mass, thus avoiding water loss during operations.

Additionally, these procedures guarantee that any groundwater that may intercept the tunnels shall suffer no change in its natural hydrological dynamics, or impact on any foreign components or water other than the water entering the system (**EIS, Annex 45**). Special attention will be paid to the quality and characteristics of any water that may eventually return to the natural water system through the tunnel access windows, and therefore construction contracts will specify measurements that must be made and the treatment that shall be required for subsequent disposal of such water, in order to ensure compliance with the quality requirements for water discharge into natural watercourses, under regulations currently in force.

In the event of seepages of water at high temperature and possible acidic composition, it is important to make clear that in general there shall be no major differences in the methods used to render the tunnel walls impermeable. During all site surveys conducted, research boreholes and surface geological maps produced to date applying to the areas through which the tunnels will pass, no evidence whatsoever has been found to lead to any prediction of the presence of

water

at high temperatures, or with mineral or acidic contamination. As additional background information, during the construction of the Alfalfal Plant - with the excavation of 35 km of tunnels - no events similar to those indicated above occurred. Notwithstanding the above, the specification establish that, in locations located close to potentially critical areas, the contractor must drill survey boreholes of between 25 m and 30 m in length ahead of the tunnel work front, in order to gain early warning of seepage problems and thus be able to apply impermeable tunnel wall treatments as required. See **EIS, Annex 45.4.**

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.05 Drought from infiltration of minimum ecological water flow

The Project's potential indirect impact on groundwater in the area of influence has been evaluated in detail in the report attached as **Annex 25 of the EIS**. According to this analysis, all aquifers located throughout the areas of influence will not be affected in any way. This is the case because the underground water flow capacity in each sector of the aquifer associated with the Maipo River is much lower than the minimum flow running through each section of the river, and therefore under all circumstances the aquifers shall remain saturated. Thus, underground water sources present in the area shall also not be affected.

Remark N° 360

REMARKS REGARDING THE ENVIRONMENTAL COMPONENT: WATER

10. The Project Owner states that it will allow a flow rate of 0.2 m³/s to bypass the intake on the Yeso River,

which is insufficient in view of the ecological flow rate of 1 m³/s established by the DGA for the Yeso River (hydrological analysis). The Project Owner is reminded that by definition, ecological flow rates apply throughout all stretches of the watercourse concerned. The Project Owner must guarantee a flow rate of at least 1 m³/s along the full length of the river.

Furthermore, we consider that the ecological flow rate and environmental water demand studies should incorporate restriction criteria based on projected increases in demand set forth in the water balances issued by the DGA for the Metropolitan Region, and variables established in prospective studies on climate variability in view of the effects of global warming.

In particular, the Project Owner should incorporate the statistical projections for the moderate and severe scenarios in the "Climate Variability Study" prepared by the Geophysics Department at the Universidad de Chile for CONAMA, as part of the Second National Communication to the UNFCCC. It should also incorporate the information generation through the adaptation to climate change study for the agriculture sector conducted by specialists at INIA and the Faculty of Agricultural and Forestry Sciences at the Universidad de Chile, for the government.

Historic statistical measurements do not per se constitute a sufficient baseline for flow rates in the river basin, as the baseline should also take into account a projection of future flow rates, and the company should therefore incorporate parameters relating to temperature increases, evaporation, and declines in precipitation and snow reserves. The minimum that could be considered to be serious would be to take into account official projections for these parameters.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river

flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate

to the presence of the Alfafal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s. Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	Stream gauge station	6,259,100	
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 361

REMARKS REGARDING THE ENVIRONMENTAL COMPONENT: WATER

11. The Project Owner establishes that it will allow a flow rate of 0.3 m³/s to bypass the intake on the Colorado River, which is not compatible with the ecological flow rate of 3.12 m³/s established by the DGA for the Colorado River (hydrological analysis). The Project Owner is reminded that by definition, ecological flow rates apply throughout all stretches of the watercourse concerned. The Project Owner must guarantee a flow rate of at least 3.12 m³/s along the full length of the river, plus environmental water demand and rights held by third parties.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in
**Chapter 2 of the
EIS.**

AGU.02.01

Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 channels

"Hanging"

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 362

REMARKS REGARDING THE ENVIRONMENTAL COMPONENT: WATER

12. The Project Owner establishes that the ecological flow rate for the Aucayes Stream will be zero. This is not acceptable, even though the corresponding water rights were granted under the old law. As this is a new project, the consideration given should center on ecological flow rate plus environmental water demand, as these are the conditions established under regulations currently in force.

If the project fails to comply with regulations in force with regard to flow rates in the Aucayes Stream, the resulting problem will certainly be major, as such actions would not only be illegal, they would also result in irreparable damage affecting residents of the area, all of whom live a lifestyle that is intimately linked to contact with nature and the sustainable usage of resources - leaving them in a very poor situation in terms of their livelihoods and economic and family activities.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS**.

This section presents information characterizing the basins and tributaries of the Volcán, Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex

13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that

will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking

into account aquatic organisms, human activities, water quality, and effects on the landscape. To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. Details are provided regarding the principal characteristics of

this program in **Chapter 8, Section 8.2.7 of the EIS**, and in **Annex 39 of the EIS**.

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neoporteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Liolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopus cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

Remark N° 363

REMARKS REGARDING THE ENVIRONMENTAL COMPONENT: WATER

13. The Project Owner should respect all existing intakes and their current water abstraction capacity, allowing a sufficient flow rate to bypass its own intakes for this requirement to be met. Furthermore, in order to be able to present a baseline study considered adequate under regulations currently in force, in particular the SEIA Regulations, the Project Owner should conduct a survey and prepare a map of irrigation requirements of persons who currently inhabit the areas that would be affected, in terms of both legally constituted water rights and usage of this water, which without doubt forms a vital support for persons and small scale economic activities in the area. In order to establish the true impacts to be caused by the project, this irrigation map should include all watercourses that will be affected through all stretches subject to any impact.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see **Table 2.3.4** in **Chapter 2 of the EIS**.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by

the
Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River
and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 364

REMARKS REGARDING THE ENVIRONMENTAL COMPONENT: WATER

14. AES Gener does not make any mention of mitigation, reparation, and compensation measures that should be taken to protect the irrigation channels owned and operated by a number of water users that will be affected by the project, inasmuch as the users shall be forced to modify and maintain the channels'

water abstraction installations, which are directly related to the potential implementation of the project in question. Thus, for example, the Project Owner correctly describes the intake installations owned and operated by the El Manzano Channel Water User Community, and also proposes works that must be implemented (steel water abstraction stabilization installations and parapets), as without these works it would not be possible to obtain water in an adequate manner. However, the Project Owner should not only describe the works, it should also describe

the cost of designing and installing them, and maintaining them over the years - costs that should be paid by the Project Owner, as they are a direct result of its project. A topographic survey is also necessary, in order to define the exact position of the works that must be built for adequate water abstraction.

It is also our duty to make the following statements with regard to the works proposed by the Project Owner:

- a) The proposal does not take into account the tolerance of the riverbed substrate, which is composed of material that was collected for the construction of the El Alfalfa road and material that gathered there as a result of the 1986 landslide, which led to a permanent increase in the depth of the riverbed substrate, which this year is approximately 60 cm deep.
- b) Possible effects on the nearby mountain are not taken into account. This land form presents a vertical cliff face approximately 50 m high on the north-west side, with a buildup of layers rising some 30 m upwards from the base of the river, as this area is prone to landslides. On the one hand, stones and small landslides periodically calve off from the hillside and partially block inflow of water into the intake, and every time that such a landslide has occurred the course of the river have been affected, giving rise to changes in the main stream flow course, diversions, and considerable increases in depth that lead to a need to recondition water intake systems. On the other hand, larger scale events also occur, such as the 1986 landslide, which totally destroyed some intakes.
- c) Taking the example of the El Manzano to illustrate the serious damage that can be caused by landslips and landslides into the river, this intake was destroyed by a landslide in 1986, and rebuilt according to designs by INDAP engineers, financed by the State. The new intake was opened in 1991, and five months later, on May 3, 1993, a landslide destroyed 85% of it, dragging a dividing wall 60 m and a containing wall 40 m. The following year it was rebuilt at the expense of its owner, and on July 14, 1995, a landslip containing approximately 11 m³ of rock and 20 m³ of sediment blocked the entry of the intake. On November 26, 1997, a landslide of approximately 24 m in length and 60 cm in depth blocked water input into the intake. On June 17, 1998, a landslip containing approximately 7 m³ of rock and 10 m³ of sediment blocked the entry of the intake. On March 24, 1999, a landslide of approximately 38 m in length and 2 m in width blocked water input into the intake. On July 7, 2003, a landslide of approximately 42 m in length and 14 m in width blocked water input into the intake. On July 22, 2005, a landslide of approximately 60 m in length and 15 m in width blocked water input into the intake. We wish to make it clear that the only external financing provided was in 1992. The El Manzano Channel Irrigation Water Community is a non-profit making organization financed solely from dues paid by its members.
- d) As shown in Figure 3 "Conceptual layout of intakes on the Colorado River" and Figure 4 Section A "Diagram of an intake with steel reinforcement", water entering the intake directly strikes the base of the mountainside, doubtless leading to landslides every time the river rises. The Project Owner does not plan to install any protection for the base of the mountainside along the stretch subject to modification in this intake design, which would cushion the force of the river against the hillside.
- e) Similarly, the Project Owner does not take into account obstructions in the flow of the river, as may be caused by tree branches, fallen trees, tires, trash, and other refuse that is continually brought downstream by the river and which interferes with its normal flow dynamics. This will lead to a requirement for the periodic extraction of all such items, to keep the intake in operation.
- f) Similarly, no measures are mentioned for application is the ecological flow (which is already minimal) drops, and no compensation is planned if water capture becomes impossible at any point in time. We observe that the Maurino Channel intake lies upstream of the El Manzano Channel intake.

In accordance with the above, the proposal to modify the intakes does not comply with minimal conditions to guarantee the permanent abstraction of water under the end user water rights held.

This is particularly serious in the case of the El Manzano Channel, as mentioned above. Therefore, the plans for all works related to channels must be revised under the standards described.

Thematic responses

Specific response

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services. For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4 in Chapter 2 of the EIS.**

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that is, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and

Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.
It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero

(0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.06 Sediment**

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study** presented in **Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfal Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (**AGU.06.01**), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted.

It can be concluded that the Maipo River system can be managed such that, with the project operations, present aggregates extraction levels can be

maintained, minimizing negative impacts on the watercourses and installations located in them.
Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

Remark N° 365**REMARKS REGARDING THE ENVIRONMENTAL COMPONENT:
WATER**

15. The baseline put forward by the Project Owner lacks the minimum necessary background information required on the aquifer that supplies drinking water to the district of San Alfonso, particularly seeing as the pumping system owned and operated by the San Alfonso Rural Drinking Water Committee is somewhat precarious and may be put at risk through the execution of the project, thus prejudicing the life and health of the town's residents.

Thematic responses**AGU Water**

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water**rights**

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in
**Chapter 2 of the
EIS.**

AGU.03.03 Underground water

Underground water will not be affected in any way by the operation of the Project. This is the case because the underground water flow capacity in each sector of the aquifer associated with the Maipo River is much lower than the minimum flow running through each section of the river, and therefore under all circumstances the aquifers shall remain saturated. Thus, underground water sources present in the area shall also not be affected.

The PHAM plans to construct 70 km of tunnels, of which approximately 50 km correspond to headworks or hydraulic pressure tunnels, the remainder being access tunnels for use during construction of the project and for subsequent operation of the power plants (see **EIS Chapter 5, Section 5.3.5.3**).

Most of these tunnels have been designed to operate at variable internal pressures, with a maximum achieved at certain points of a little more than 450 m. The design requirement for these tunnels is that the lower limit of principal compression in the surrounding rock medium is always less than the operating pressure, such as to maintain a sufficient safety margin to prevent alterations in natural permeability dynamics through hidrojacking. In areas where this design principle is not guaranteed, the Project plans to install impermeable tunnel linings (**EIS, Annex 45.4**).

During the excavation of these tunnels, it is possible that the work front may have to pass through permeable rock strata - leading to seepages of water into the tunnel, the magnitude of which will depend on the permeability of the rock, the depth of the tunnel, and the level of the water table. In some areas, tunnel wall treatments may have to be applied in order to prevent water transfer into or out of the headworks tunnels.

The Project does not plan to make use of any water seepages that may arise, in the generation of electricity. Additionally, the overarching design principles underpinning the Project are oriented towards limiting seepages during construction, in order to establish suitable conditions for efficient tunnel excavation activities. The same principle applies to methods to limit the infiltration of water from the tunnels into the rock mass, thus avoiding water loss during operations.

Additionally, these procedures guarantee that any groundwater that may intercept the tunnels shall suffer no change in its natural hydrological dynamics, or impact on any foreign components or water other than the water entering the system (**EIS, Annex 45**). Special attention will be paid to the quality and characteristics of any water that may eventually return to the natural water system through the tunnel access windows, and therefore construction contracts will specify measurements that must be made and the treatment that shall be required for subsequent disposal of such water, in order to ensure compliance with the quality requirements for water discharge into natural watercourses, under regulations currently in force.

In the event of seepages of water at high temperature and possible acidic composition, it is important to make clear that in general there shall be no major differences in the methods used to render the tunnel walls impermeable. During all site surveys conducted, research

boreholes and surface geological maps produced to date applying to the areas through which the tunnels will pass, no evidence whatsoever has been found to lead to any prediction of the presence of water at high temperatures, or with mineral or acidic contamination. As additional background information, during the construction of the Alfalfal Plant - with the excavation of 35 km of tunnels - no events similar to those indicated above occurred. Notwithstanding the above, the specification establish that, in locations located close to potentially critical areas, the contractor must drill survey boreholes of between 25 m and 30 m in length ahead of the tunnel work front, in order to gain early warning of seepage problems and thus be able to apply impermeable tunnel wall treatments as required. See **EIS, Annex 45.4.**

Remark N° 366

REMARKS REGARDING THE ENVIRONMENTAL COMPONENT: WATER

16. The EIS presented by the Project Owner does not contain a serious and in-depth study of the groundwater and other underground aquifers that could be damaged by the implementation of the project. This is particularly serious in the case of a number of areas where drinking water supplies are sourced from groundwater, and where large ecosystems of flora and fauna require this resource for their survival. In view of changes in flow rates that shall occur under the project, the wide range of impacts in the area of watercourse flow dynamics, and the scarcity of scientific information in this field, the possibility of damage to these vital sources of fresh water is very high - with a strong risk of causing permanent and irreparable harm. Therefore, and in accordance with SEIA regulations, the Project Owner is requested to attach sufficient studies and background information regarding this parameter.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS**.

This section presents information characterizing the basins and tributaries of the Volcán, Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex

13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS**.

AGU.03.03 Underground water

Underground water will not be affected in any way by the operation of the Project. This is the case because the underground water flow capacity in each sector of the aquifer associated with the Maipo River is much lower than the minimum flow running through each section of the river, and therefore under all circumstances the aquifers shall remain saturated. Thus, underground water sources present in the area shall also not be affected.

The PHAM plans to construct 70 km of tunnels, of which approximately 50 km correspond to headworks or hydraulic pressure tunnels, the remainder being access tunnels for use during construction of the project and for subsequent operation of the power plants (see **EIS Chapter 5, Section 5.3.5.3**).

Most of these tunnels have been designed to operate at variable internal pressures, with a maximum achieved at certain points of a little more than 450 m. The design requirement for these tunnels is that the lower limit of principal compression in the surrounding rock medium is always

less than the operating pressure, such as to maintain a sufficient safety margin to prevent alterations in natural permeability dynamics through hidrojacking. In areas where this design principle is not guaranteed, the Project plans to install impermeable tunnel linings (**EIS, Annex 45.4**).

During the excavation of these tunnels, it is possible that the work front may have to pass through permeable rock strata - leading to seepages of water into the tunnel, the magnitude of which will depend on the permeability of the rock, the depth of the tunnel, and the level of the water table. In some areas, tunnel wall treatments may have to be applied in order to prevent water transfer into or out of the headworks tunnels.

The Project does not plan to make use of any water seepages that may arise, in the generation of electricity. Additionally, the overarching design principles underpinning the Project are oriented towards limiting seepages during construction, in order to establish suitable conditions for efficient tunnel excavation activities. The same principle applies to methods to limit the infiltration of water from the tunnels into the rock mass, thus avoiding water loss during operations.

Additionally, these procedures guarantee that any groundwater that may intercept the tunnels shall suffer no change in its natural hydrological dynamics, or impact on any foreign components or water other than the water entering the system (**EIS, Annex 45**). Special attention will be paid to the quality and characteristics of any water that may eventually return to the natural water system through the tunnel access windows, and therefore construction contracts will specify measurements that must be made and the treatment that shall be required for subsequent disposal of such water, in order to ensure compliance with the quality requirements for water discharge into natural watercourses, under regulations currently in force.

In the event of seepages of water at high temperature and possible acidic composition, it is important to make clear that in general there shall be no major differences in the methods used to render the tunnel walls impermeable. During all site surveys conducted, research boreholes and surface geological maps produced to date applying to the areas through which the tunnels will pass, no evidence whatsoever has been found to lead to any prediction of the presence of water at high temperatures, or with mineral or acidic contamination. As additional background information, during the construction of the Alfalfal Plant - with the excavation of 35 km of tunnels - no events similar to those indicated above occurred. Notwithstanding the above, the specification establish that, in locations located close to potentially critical areas, the contractor must drill survey boreholes of between 25 m and 30 m in length ahead of the tunnel work front, in order to gain early warning of seepage problems and thus be able to apply impermeable tunnel wall treatments as required. See **EIS, Annex 45.4**.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

AGU.04.05 Drought from infiltration of minimum ecological water flow

The Project's potential indirect impact on groundwater in the area of influence has been evaluated in detail in the report attached as **Annex 25 of the EIS**. According to this analysis, all aquifers located throughout the areas of influence will not be affected in any way. This is the case because the underground water flow capacity in each sector of the aquifer associated with the Maipo River is much lower than the minimum flow running through each section of the river, and therefore under all circumstances the aquifers shall remain saturated. Thus, underground water sources present in the area shall also not be affected.

Remark N° 367**REMARKS REGARDING THE ENVIRONMENTAL COMPONENT:
WATER**

17. The methodology presented by the Project Owner for the calculation of ecological flow rates was developed for river-type hydrological systems, where the base of the ecological energy pyramid consists of endemic phytoplankton. It therefore fails to take into account the input of organic material from outside of the system in the functioning of such river ecosystems. It is requested that this situation be evaluated. Furthermore, it is a known fact that reductions in flow rates will lead to an increase in water temperatures, yet this issue was not adequately addressed by the Project Owner, and completed specific studies should therefore be presented.

Thematic responses**AGU Water**

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS**.

This section presents information characterizing the basins and tributaries of the Volcán, Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex 13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS**.

F&F Biodiversity Impact**Flora and
Fauna**

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

Remark N° 368

REMARKS REGARDING THE ENVIRONMENTAL COMPONENT: WATER

18. The Project Owner should establish the methodology to be used to monitor what it defines as "sampling during construction", in order to detect the existence of acidic or alkaline drainage. It should also present the design to be used for pools to be used to neutralize any chemical issue that may arise at each of the planned muck disposal heaps. It is vital that the location of these pools must be specified, as many of the muck disposal heaps are to be located close to natural watercourses and these heaps are therefore at risk of contamination. Thus, for example, it is highly likely that the Aucayes Stream will suffer some level of contamination if operating errors occur during any phase of the process. All in all, these projections and studies must be conducted with regard to all watercourses that potentially could become contaminated.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

MAR Muck

The PHAM plans to construct approximately 70 km of tunnels. The excavation of these tunnels will generate inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of inert material produced in road building and the construction of buried conduits.

This muck material will be deposited in the 14 muck disposal heaps that the Project plans to create. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria. For more information, please see **Annex 6 of the EIS** and **Annex 3 of the Addendum**.

MAR.05 Composition and Hazardousness

Although the waste material produced from tunneling activities will be inert - in the construction of tunnels for the Alfalfal Plant, where 35 km of tunnels were excavated, no evidence was found of material that could lead to acidic or basic drainage in contact with rainwater - the PHAM includes a management plan applicable to water that may be produced from contact between muck or waste rock and rainwater or snow. For further details, see Annex 6 of the EIS. The Project Owner plans to take measurements to assess the possibility of acidic drainage at the muck disposal heap sites, as indicated in **Annex 6, Section 5 in the EIS** and **Response 10 in Section 9 of Addendum 1**. The actions will form part of the Environmental Monitoring Plan, and will be preventive rather than response actions.

RES Waste

The Project Owner indicates that most waste generated will be produced during the Project's construction phase. Two types of waste will be produced:

- **Solid waste:**
Construction waste such as wood, piping offcuts, rubble, wires, waste packaging, metals, etc.
Domestic waste or waste similar to domestic waste; plant waste such as remains of shrubs, weeds, and smaller quantities of tree waste removed from work sites.
- **Liquid waste:**
Applicable to the following activities: concrete production, washing and preparation of aggregates, and washing of truck chassis and load beds, machinery, and tools. Other liquid waste relates to wastewater from bathrooms, showers, canteens, and other activities conducted within encampments and site installations.

Gener will place strict contractual requirements on Contractors during the construction phase, aiming to ensure suitable management and final disposal of waste. Additionally, contractors and subcontractors shall agree to comply with regulations and oversight actions established by Law, to be applied to all works of this nature. The planned environmental management manual will prevent the occurrence of any pollution events linked to the Project (**see EIS, Annex 18**).

RSG Risk

The Project Owner possesses a general risk prevention strategy that imposes certain measures on the Project during its different stages of advance. This strategy features the following components:

- a) Measures incorporated into the Project's engineering design.
- b) Systematic verification of compliance with applicable regulations
- c) Establishment of restricted areas
 - c.1) Area restricted due to their archeological, paleontological, or heritage value
 - c.2) Area of natural value that requires protection by the Project
 - c.3) Officially protected area.

- d) Expert supervision during construction
- e) Training regarding environmentally sensitive issues
- f) Internal risk management and accident prevention programs g)
Separation of works installations and encampments

For further information on each of these points, please see **Chapter 7 of the EIS**, which specifies the **Environmental Management Plan**, the **Risk Control and Prevention Plan** designed for the Project, the safety measures to be adopted in light of the risks identified, and, finally, the **Accident control plan**, to be activated in the event of the failure of the preventive measures taken by the Project Owner. Furthermore, **Annex 32 of the EIS** presents the **Risk and Contingency Prevention Plan** for contractors.

SLD Health Impact

The Project owner shall take responsibility for ensuring compliance with health and safety regulations, in order to prevent any possible risk to health and physical integrity for the inhabitants of San José Maipo as well as the persons working on the Project.

SLD.02 Atmospheric

Although the Project involves surface construction activities, which will lead to the emission of particulate matter, plans call for the implementation of a suite of mitigation measures that will result in a considerable reduction in emission, not only of the PHAM itself but also as against the baseline of current particulate emissions through the Project's area of influence. In addition to the above, these considerations should be evaluated bearing in mind the fact that most of the Project's works will be underground, not producing any emissions of particulate matter. Conversely, given that most of the Project's works are to be located in high mountain areas, it can be stated that the prevailing ventilation conditions in this environment will facilitate the dispersion of dust, with a natural reduction in emissions during the winter season as a result of the additional moisture contributed by rain and snow precipitation.

For more information on emissions compensation measures, see **Annex 5 of the EIS**.

SLD.02.01 Pollutants

The Project's atmospheric emissions will correspond to dust suspended in the air as a result of earth moving activities (during excavations, loading and unloading, etc.), and the movement of vehicles at surface work areas. Emissions control will be conducted by means of:

- conservation of existing roads currently used by mine trucks,
- all new roads built will be treated with bischofite. Additional information provided in Section I, Question 42 and Section VI, Question 17, in the Addendum.
- use of tarpaulins covering truck loads,
- timely mechanical maintenance of equipment, machinery, and vehicles, and wetting of dusty surfaces
- use of wagons and belt conveyors for the removal of muck from within tunnels, and similar.

The Project Owner has conducted three studies to estimate emissions, which are included in Annexes 4 and 5 of the EIS. These studies describe the analysis of estimates of atmospheric emissions caused by the PHAM, as well as the Emissions Compensation Program. The study identifies the Project activities that generate emission, quantifies the amount of emissions thus produced, estimates the quantity of emissions for each pollutant during each year of the construction phase, and, finally, develops the Project's emissions compensation program.

Remark N° 369

REMARKS REGARDING THE ENVIRONMENTAL COMPONENT: SOIL

1. The Project Owner should present the design to be used for the protective element of "artificial slope base barrier" for each of the muck disposal heaps planned under the project, taking into account the proximity of natural watercourses. If protection cannot be placed in such a way as to safeguard the watercourse, the muck disposal heap should be relocated - as otherwise, a serious risk to the life and health of the population is created, also affecting livestock and crops, and such a risk cannot be approved by COREMA.
2. Muck Disposal Heap 1 is planned to be located in the area known as the Valle del Arenas, which - in contrast to statements made by the Project Owner - does indeed possess "natural value", as well as value for tourism and paleontology. Therefore, and in view of the scale of works planned, the Project Owner should at least present a survey of bird life inhabiting the area where it plans to install its muck disposal heap and encampment, with a plan to monitor and recover affected wildlife.
3. Sufficient hydro-geological studies for the establishment of a baseline or for project monitoring do not exist; in this regard, for example, no serious prediction is presented regarding the possibility of leakages in the many kilometers of conduits planned as part of the project. In order to conduct such a study, it would be necessary to take samples in all sectors that the conduits will pass through, and to define risks associated with the installation that will arise during the project's operations phase in view of the geological structure of the sampled strata and the depth at which the conduits will pass.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03.02 Geology

The baseline studies used in determining the geological characteristics of the Project area are presented in **Section 5.3.6 of the EIS**. Additionally, the **hydro-geological baseline studies** for the Project area are presented in **Section 5.3.5.3 of the EIS**. Complementary information is also provided in **Annex 45 of the EIS**.

Both of these studies start with general background information on the area where the Project is to be installed, going on to present a detailed description of the geological and geomorphological characteristics of specific areas where Project works or activities are planned. Complementary information is provided in **Annex 8 of the Addendum**.

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempeo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or

moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neopteris curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo Spinolosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Liolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.02 Form of mitigation

Aquatic flora and fauna

The Project calls for a suite of multi-purpose environmental management measures that aim to minimize its effects on living organisms, including: minimization of watercourse areas to be subject to intervention by prioritizing such works for late summer and early fall seasons (period of lowest flow rates), the adoption of special precautions to prevent accidental spillages into watercourses (prohibition of the storage of lubricant drums in or near watercourses, etc), and permanent maintenance of ecological flow rates.

For more detailed information, including technical documentation that complements the information described above, see Annex 17 of the Addendum.

Terrestrial Flora and Vegetation

In order to prevent and/or minimize the Project's effects on plant life, it plans to adopt a number of integrative measures: micro-routing in advance of starting work on-site, in order to identify specimens of plants listed in any conservation category and subject to impact; compensation with the planting of 10 specimens for every one destroyed, in the case of non-woodland species listed for conservation; implementation of a woodland management plan applicable to woodland areas, which describes its measures in accordance with Article 5 of the Woodland Law; implementation of vegetation restoration plans at muck disposal sites, encampments, artificial slopes, and tunnel access terraces (EIS, Annexes 7 and 29). More in-depth information on complementary measures is provided in Annex 6 of Addendum 1.

Terrestrial fauna

Specific wildlife environmental management measures have been proposed for each particular species, taking into account prior experience in the success of these measures in similar projects. These measures will be implemented in continual coordination with the Servicio Agrícola y Ganadero. Principal measures include: capture of individuals belonging to species of conservation interest for rescue and relocation; controlled perturbation actions; and habitat replacement. Other measures are based on the use of signage, training for Contractors, and contractual requirements for on-site supervision (see details in Section 6.4.1.6 of the EIS). See Annex 4 of the Addendum for the native wildlife rescue and relocation plan.

MAR Muck

The PHAM plans to construct approximately 70 km of tunnels. The excavation of these tunnels will generate inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of inert material produced in road building and the construction of buried conduits.

This muck material will be deposited in the 14 muck disposal heaps that the Project plans to create. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria. For more information, please see **Annex 6 of the EIS** and **Annex 3 of the Addendum**.

MAR.01 Regulations

The Project Owner has made available a Management Plan for "Project Muck Disposal Heaps", which contains information on the technical, environmental, and safety specifications of the heaps, as well as recommendations

contained in the Ministry of Public Works' 2004 Environmental Management Plan Manual for Works Subject to Concessions. In particular, the Plan establishes the environmental considerations adopted for the operation of the muck disposal heaps, to be implemented during the construction of tunnels and roads under the PHAM.

In order to comply with the environmental management measures contained in the EIS, an Environmental Monitoring Program will be conducted, with the aim of verifying the effectiveness of these measures and compliance with them. For details on the principal actions included in the Monitoring Program, and for the various stages of functionality of the muck disposal sites, see

Annex 6 of the EIS and Annex 3 of Addendum 1.

For more information on the specific regulations applicable to the Project, and compliance therewith, see **Chapter 3 of the EIS**.

MAR.02 Location

The PHAM calls for the creation of 14 muck disposal heaps, for the disposal of waste material from tunnel boring and smaller quantities of inert waste from the construction of roads and buried conduits. Maps of the muck disposal heaps, and a copy of the muck disposal heap management plan, are included in Annex 6 of the Project EIS. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria.

From a technical and safety perspective, the muck disposal heap sites have been located as close as possible to exit points from tunnels and to surface work sites, in areas not at risk to landslides or landslip events.

The following aspects have been taken into account as environmental criteria in site selection: Sites have been selected that are distant from any settlements or any housing used on a

permanent or temporary basis.

Priority has been given to selecting sites with low visual impact - that is, in areas that are distant from potential observation points on public highways or high ground.

In the Project area's higher elevation regions, the disposal heaps have been sited up against natural topological features, such that the emplacement of the heaps' layers forms a continuation of the general landform structures of the area.

In general these are areas that are of low value as a habitat for plant life (soils with usage capacity ratings V, VI, and VII), and efforts have been made to avoid modifications to the original land form structures present or to surface watercourses.

Surface surveys have been conducted in all of these regions, as details in **Section 5.8, in Chapter 5 of the EIS**, to rule out the presence of sites of archeological and/or paleontological value at the muck disposal heap sites.

For more information, see **Annex 6 of the EIS** and **Annex 3 of Addendum 1**.

Remark N° 370

REMARKS REGARDING THE ENVIRONMENTAL COMPONENT: AIR

The Project Owner is requested to clarify whether it plans to use explosives and/or equipment that produces vibrations during the construction of the tunnels, roads, and other infrastructure items to be built in the land holdings known as Hoya, Laguna Negra y Estero San Nicolás, Higuera Lote W 3, Hoya Embalse el Yeso, San Francisco de Lagunillas, and Hacienda Río Colorado. This information is necessary in order to permit the evaluation of the impacts of these vibrations on the geological structure of the land areas (particularly the line to be taken by the tunnel) and associated hydro-geology that nourishes the areas meadows/wetlands and high altitude springs - and on the slopes of the Rincón de los Turistas and Piuquencillos mountain, where glaciers are present.

Thematic responses

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly

frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

RSG Risk

The Project Owner possesses a general risk prevention strategy that imposes certain measures on the Project during its different stages of advance. This strategy features the following components:

- a) Measures incorporated into the Project's engineering design.
- b) Systematic verification of compliance with applicable regulations
- c) Establishment of restricted areas
 - c.1) Area restricted due to their archeological, paleontological, or heritage value
 - c.2) Area of natural value that requires protection by the Project
 - c.3) Officially protected area.
- d) Expert supervision during construction
- e) Training regarding environmentally sensitive issues
- f) Internal risk management and accident prevention programs
- g) Separation of works installations and encampments

For further information on each of these points, please see **Chapter 7 of the EIS**, which specifies the **Environmental Management Plan**, the **Risk Control and Prevention Plan** designed for the Project, the safety measures to be adopted in light of the risks identified, and, finally, the **Accident control plan**, to be activated in the event of the failure of the preventive measures taken by the Project Owner. Furthermore, **Annex 32 of the EIS** presents the **Risk and Contingency Prevention Plan** for contractors.

RSG.03 Blasting

Excavation methods using explosives will be used for the excavation of a proportion of the tunnels involved in the Project. Other tunnels will be excavated using a Tunnel Boring Machine, as described in **Section 2.3.2.2 the EIS**. The surface points where blasting will lead to perceptible effects are

located close to the entrances of the tunnels that are to be constructed using the traditional drill and blast excavation technique (**Section 6.4.1.2 and Section 6.4.1.3 of the EIS, and Section 6, Question 26 in the Addendum**). At surface locations in areas where tunnels are to be excavated using the traditional method, no vibrations will be caused that could lead to risks of landslides, rockfalls, and landslips resulting from the construction of the tunnels, because these excavation techniques will be used at a great depth below the surface.

Noise from blasting will only be audible during the opening of the ends of the tunnels. Once inside the tunnels, excavation works (including detonations) will not be audible, and therefore will not constitute a significant source of noise, and audible blasting will therefore only occur

while the ends of the tunnels are being excavated. It is estimated that there will be 2 or 3 detonations per day at each work site. Based on these levels, added to the background noise in each area, it was determined that noise will not rise above the maximum levels

permitted under MINSEGPRES Supreme Decree 146/97. For more information on this topic, see **Section 6.4.1.2 of the EIS** and **Section 8.2.2 of the EIS**, which describe the noise and vibration monitoring program associated with the blasting activities, as established in **Section 6, Question 41 of the Addendum**.

It is important to point out that a controlled intervention will be completed in advance of blasting, consisting of the installation of work platforms, through the removal of vegetation and the rescue of individual plants and/or animals of conservation interest that present low mobility, limited populations, and endemism, and other characteristics of the project and the range of the species in question (see Annex 4 of the Addendum), in particular through the implementation of the "Wildlife Rescue and Relocation Plan".

Regarding the construction of the El Volcán Tunnel, located beneath the El Morado Monument, the depth of the tunnel will vary between 550 m and over 1500 m. No impacts are expected relating to vibrations reaching the El Morado Glacier. For more information, see **Addendum 1, Section 6, Response 13 and Section 1, responses 4, 5 and 6**.

With regard to safety measures planned applying to the handling and storage of explosives, specified in Annex 32 of the EIS, regulatory stipulations for risk prevention and emergency control are provided that will apply to all contracting of works and/or services by Gener, in compliance with the requirements set forth in Law 16,744, Article 66 part 2. See also **Addendum 1, Section 1, Question 35**.

SLD Health Impact

The Project owner shall take responsibility for ensuring compliance with health and safety regulations, in order to prevent any possible risk to health and physical integrity for the inhabitants of San José Maipo as well as the persons working on the Project.

SLD.02 Atmospheric

Although the Project involves surface construction activities, which will lead to the emission of particulate matter, plans call for the implementation of a suite of mitigation measures that will result in a considerable reduction in emission, not only of the PHAM itself but also as against the baseline of current particulate emissions through the Project's area of influence. In addition to the above, these considerations should be evaluated bearing in mind the fact that most of the Project's works will be underground, not producing any emissions of particulate matter.

Conversely, given that most of the Project's works are to be located in high mountain areas, it can be stated that the prevailing ventilation conditions in this environment will facilitate the dispersion of dust, with a natural reduction in emissions during the winter season as a result of the additional moisture contributed by rain and snow precipitation.

For more information on emissions compensation measures, see **Annex 5 of the EIS**.

Remark N° 371

REMARKS REGARDING THE ENVIRONMENTAL COMPONENT: FLORA AND FAUNA

1. With regard to the methodology used to calculate flow rates, it should be pointed out that the study on terrestrial wildlife makes fundamental contributions for the establishment of ecological flow rates compatible with the conservation of the area's wildlife, with particular emphasis on species for which insufficient data exists to define a conservation status, as classified by the SAG and identified in the study on the area. Therefore, the study on land fauna should be completed in advance of establishing these ecological flow rates, with criteria restricted to hydrological considerations. It is clear that the Project Owner does not intend to comply with the requirements set forth under Law 19,300 and corresponding regulations, and it therefore fails to present an analysis that would permit the establishment of a suitable baseline; it is thus impossible to predict the impacts of the project. At least four vulnerable and endangered species would be directly affected by the implementation of the project:

1. Torrent Duck (*Merganetta armata*)
2. Frangel or Olivillo (*Kageneckia angustifolia*)
3. Guayacán (*Porlieria chilensis*)
4. Black Spiny Chest Frog (*Alsodes nodosus*).

Of these species, the Torrent Duck would be most severely affected, as - according to the information presented by the Project Owner itself, this species is to be found in the Yeso River (page 32), for which the ecological flow rate proposed was calculated at 1 m³/s. Taking into account the information cited by the Project Owner itself (page 33) "... these birds are associated exclusively with mountain rivers and streams, where they prefer to feed on benthic aquatic invertebrates, which they hunt by diving in strong currents (Carboneras, 1992). Historically, this species has been considered scarce, perhaps as a result of its specialized habitat requirements (Phelps & Meyer

de Schauensee, 1978) and its need for rivers with high water quality (Johnsgard, 1966)." This description leads to the conclusion that the habitat of the Torrent Duck will be violently altered with no possibility of recovery, as the species is - as the Project Owner puts it - "notably territorial". The decline in flow rate in the Yeso River will destroy the habitat of this endangered species, in one of the few sites where it can be found in the Metropolitan Region. This clearly contravenes the requirement established under the Metropolitan Region Biodiversity Conservation Strategy, which designates the Yeso, Volcán, and Maipo river basins as Priority Conservation Sites - the corresponding implementation plan is established in the Andean Santiago Plan. These legal instruments allow Chile to meet the commitments to which it has agreed under the Convention on Biodiversity Conservation.

The Project Owner is requested to conduct appropriate studies that show that the ecological flow rate for this watercourse will be adequate for continued use as habitat by the Torrent Duck - which is not shown in the EIS as submitted, as the ecological flow rate presented by the Project Owner is as measured at the intake, whereas for this particular species it should be measured and guaranteed at the confluence with the Maipo River.

2. With regard to plant life in the project's area of influence, management plans are only mentioned for the Guayacán and Olivillo plants, but not for other species of flowers, bushes, and trees that may be affected by the project - all other species are simply omitted by the Project Owner in its EIS. It is therefore necessary for the Project Owner to conduct appropriate studies that provide knowledge regarding which other species may be affected by the project, and what plans will be made to reduce such impacts.

3. In Annex 23, the Baseline Report on Terrestrial Arthropods Present in the Project Area, which was attached by the Project Owner in response to a request for information on which invertebrate species or populations may be affected by the project, was applicable only to the areas of La Engorda and the Aucayes-Maitenes woodlands - just a small proportion of the project's area of influence. This significantly affects the reliability of the data presented in the study attached in Annex 23.

The same report, in Annex 23, concludes that for the arthropod species in the area, "...there is a clear lack of information on their host plants or other specific ecological requirements. As was suggested above, in terms of conservation, the area's arthropods should be considered to be insufficiently studied", and the butterfly *Yramea lathonioides* may potentially be vulnerable to damages caused by the implementation of the Alto Maipo project, due to its specificity in habitat ranges and its narrow altitude distribution".

All in all, in order to comply with plant and wildlife conservation regulations and SEIA regulations, the Project Owner should expand its studies by surveying existing fauna and assessing the possibility that negative impacts may arise.

4. With regard to the sclerophyllous woodland present around the Colorado River and the Aucayes Stream, the Project Owner is requested to clarify whether species are present that could be more severely affected by a decline in flow rates, particularly those that are found in damper areas.

The Project Owner has stated that "the Aucayes Stream will not be affected by the Project. However, in any case to date this stream shows no impact on plant species or communities growing close to the stream banks, even though its flow rate has suffered a reduction since the Maitenes Plant became operational". However, this statement is vague, and a higher quality and more detailed study would be required in order to determine whether any damage will indeed be caused in the Aucayes Stream area, affecting plant life found there and associated animal species.

5. The Project Owner promises to take population measurements for the Torrent Duck, Black Spiny Chest Frog, and Cururo, but this promise is not underpinned with any binding agreement. It is mentioned that these studies would be conducted once the construction of the project had begun, agreeing only to form an agreement with the SAG regarding methodology.

Here, it must be assumed that species that require environmental conditions dependent on the force of the river's current are able to tolerate a 90% drop in water volume, as a quantitative decline in environmental parameters would be sufficient to cause an irrecoverable environmental impact that could clearly not be mitigated.

A population study conducted with no baseline for comparison merely describes the population situation under the prevailing environmental conditions at the time that the study is conducted. In other words, the baseline study will be post mortem for the species at this site - which makes no sense and expressly and deeply contravenes the SEIA, its regulations, and most of all its guiding principles, as one of the fundamental concepts is that

the project's impacts must be mitigated, repaired, or compensated. It is impossible to comply with this requirement when the Project Owner plans to conduct a study that ought to be included in the baseline, after the project has already begun.

6. With regard to the felling of over 3000 specimens of Frangel or Olivillo as a result of the extension of the Aucayes Stream road by more than 8 km, it is considered that the Felling Management and Reforestation Plan presented is absolutely invalid, as this plan should be presented to and signed by the owner of the property to be subject to intervention - in this case, the Ministry of Public Goods.

The reduction in population density of Frangel trees - a vulnerable species of high biological value - is once again in clear contravention of the requirements set forth in the Regional Biodiversity Conservation Strategy and the Andean Santiago Action Plan, where this species is listed as a priority species for conservation.

This situation also applies to the Guayacán, as more than 500 specimens of this species are to be felled. The Project Owner is requested to clarify the situation and the presentation of the Felling Management and Reforestation Plan to CONAF, and to explain how the Ministry of Public Goods has agreed to sign this management plan. With regard to restoration, the company asserts that it will use the ecological succession process in recovering the woody species covered in Annex 17.

It should also be made clear, "that the Vegetation Restoration Plan is not a compensation measure applicable to individual plant specimens extracted, but rather shall be implemented rigorously in the sites subject to intervention where a possibility of recovery exists, with the principle objective of stabilizing land after construction activities and, inasmuch as is possible, reconstructing previously existing vegetation in order to control erosion, mitigate visual impact, and restore animal habitats". Due to the process of ecological succession, it consists "of changes that may apply

to tens, hundreds, or thousands of years, and that stands above shorter time scale fluctuations and cycles; succession is a phenomenon of progressive occupation of areas" (<http://tars.eup.us.es/master/ponencias/moduI06/sucesion.pdf>), the methodology proposed by AES-GENER implies:

- a) Systematically and deliberately ignoring the requirements of the Chilean State regarding environmental mitigation.
- b) Leaving the effects of project works on properties to nature's capacity to regenerate, and to the knock-on effects of any other type of fluctuation in the ecosystem, be it physical/chemical, chemical, microbiological, or biological. In this case, only the maintenance of these conditions, with no alterations whatsoever, can permit the occurrence of the phenomenon of ecological succession. It shall be practically impossible to guarantee such conditions, taking into account the level of human activity required by the PHAM - as is recognized by the company: "Considering that in most cases the substrate to be left at the site shall not be the same as that from which the specimens were extracted".

It therefore cannot be expected that the phenomenon of ecological succession will occur, for the recovery of the 40 species that will be extracted from their habitat, as the soil into which they

will be replanted shall not be the same, and as the environmental stress to which they will be subjected on-site over a period of three or more years shall render the maintenance of the environmental equilibria necessary for the phenomenon of ecological succession impossible. This means that the sites will remain as wasteland, not only for centuries (as would be normal for ecological succession) but rather forever.

All in all, it appears vital that the company should present sufficient studies in this area, most of all relating to the management of the area's tree species.

7. Supreme Decree NQ 82/74 and the Santiago Metropolitan Master Plan (8.3.1.1) indicate that the Project Owner must ensure the restoration of the landscape in all areas that will be subject to intervention. In Annex 17 of Addendum 2, the Project Owner proposes leaving "landscape restoration in all areas to be subject to intervention" to the phenomenon of ecological succession, which operates over time scales ranging from 7 years (merely to begin) through to 1000 years for medium height trees.

Additionally, in the same response the Project Owner states that the original soil of areas subject to intervention will be replaced. This will delay the process of primary ecological succession as a result of the manner in which the Project Owner will implement the soil exchange procedure, as indicated in Annex 17 of Addendum 2.

Thematic responses

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles,

70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.01 Regulations

The Project Owner shall comply with all legal environmental and sector-based regulations and requirements in force and applicable to the Project during the different phases of its development. The Project Owner has guaranteed compliance with the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and compliance with sector environmental permits.

Environmental regulations that apply to the Project have been identified based on its activities' potential environmental impacts affecting flora and fauna. The full extent of these regulations is included in **Chapters 3 and 4 of the EIS, and in Section 2, Question 1 in Addendum 1.**

**F&F.02 Identification of
species affected**

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3**, and **Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neoporteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Lilolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

F&F.02.02 Mitigation

Aquatic flora and fauna

The Project calls for a suite of multi-purpose environmental management measures that aim to minimize its effects on living organisms, including: minimization of watercourse areas to be

subject to intervention by prioritizing such works for late summer and early fall seasons (period of lowest flow rates), the adoption of special precautions to prevent accidental spillages into watercourses (prohibition of the storage of lubricant drums in or near watercourses, etc), and permanent maintenance of ecological flow rates.

For more detailed information, including technical documentation that complements the information described above, see Annex 17 of the Addendum.

**Terrestrial Flora and
Vegetation**

In order to prevent and/or minimize the Project's effects on plant life, it plans to adopt a number of integrative measures: micro-routing in advance of starting work on-site, in order to identify specimens of plants listed in any conservation category and subject to impact; compensation with the planting of 10 specimens for every one destroyed, in the case of non-woodland species listed for conservation; implementation of a woodland management plan applicable to woodland areas, which describes its measures in accordance with Article 5 of the Woodland Law; implementation of vegetation restoration plans at muck disposal sites, encampments, artificial slopes, and tunnel access terraces (EIS, Annexes 7 and 29). More in-depth information on complementary measures is provided in Annex 6 of Addendum 1.

**Terrestrial
fauna**

Specific wildlife environmental management measures have been proposed for each particular species, taking into account prior experience in the success of these measures in similar projects. These measures will be implemented in continual coordination with the Servicio Agrícola y Ganadero. Principal measures include: capture of individuals belonging to species of conservation interest for rescue and relocation; controlled perturbation actions; and habitat replacement. Other measures are based on the use of signage, training for Contractors, and contractual requirements for on-site supervision (see details in Section 6.4.1.6 of the EIS).

See Annex 4 of the Addendum for the native wildlife rescue and relocation plan.

Remark N° 372

E. REMARKS REGARDING SOCIO-ECONOMIC COMPONENTS: SOCIAL AND CULTURAL

1. Muck Disposal Heap 1 is planned to be located in the area known as the Valle del Arenas, which - in contrast to statements made by the Project Owner - does indeed possess "natural value", as well as value for tourism and paleontology
 From a tourism perspective, it should be pointed out that the Arenas area has potential for the development of sport climbing, notwithstanding the omission by the Project Owner of the site known as "Boulder del Arenas".
 The Project shall affect sites of incalculable heritage value, and yet information is provided on only some of these sites, identified in the Baseline, omitting other sites that may also be affected. Three areas are identified as featuring resources of cultural interest: Las Morrenas and Camino del Inka in the Lo Encañado Lake area, and the site known as Aucayes 1 in the Colorado River - Aucayes Stream area, as well as a site of paleontological interest as Alto Volcán.
 Nonetheless, the Project Owner does not mention what methods will be used to ensure the protection of the archeological and paleontological heritage identified - an issue that ought to be included in the EIS.
 In this regard, simple contractual requirements for contractor companies are not sufficient, as compliance with regulations specified in any Environmental Qualification Resolution that may be granted cannot be delegated by the Project Owner.
2. The Project Owner fails to recognize the existence of a site of immense paleontological value that is unique in Chile: 150 million year old dinosaur footprints. Under the protection granted under current legislation, at the very least this area should be protected and no commercial project that would affect it should be conducted. No information is available on such ichnofossils of this age in Chile, so studying them could yield a major contribution to Chilean and global paleontology.
3. The Project documentation omits information on the existence of geological structures that are unique in Chile and that are of incalculable value, which currently constitute an "open air museum" and that could be subject to irreparable damage. These formations include a number of types of mudcrack and raindrop structures with ages between 155 and 150 million years. A detailed survey should be conducted to document these features, and the area should then be given protected status due to the scientific value of these structures, which are unique in Chile.
4. The project's area of influence covers more than half of the district of San José de Maipo, which has been granted the status of an Area of National Tourism Interest (ZOIT). In view of the scale of the roads, trails, water conduits, encampments and site installations, waste disposal heaps, and traffic effects, as well as other construction impacts, the project will have a significant effect on the road network, landscape value, and flow rates in rivers and streams - the key attractions of the ZOIT.
 However, the Project Owner has not presented adequate information or analysis regarding the status of the ZOIT, covering impacts affecting the area as a whole with and without the project; rather, it merely proffers a partial statement that a particular intake will have little impact, that reductions in flow rate will not be perceptible from the road, or that an area lacks tourism initiatives. This approach falls far short of responding to the concerns of the community regarding short term and medium term impacts on tourism development and activities in the area.
 The Project Owner should at least conduct a study into the project's impacts on the area's growing tourism development, in terms of landscape value and the wide range of attractions that could be seriously affected by the installation of the project.
5. The Project does not include climate monitoring stations, which should be born in mind in order to evaluate modifications to surface watercourses - particularly in view of the increase in the altitude of the zero degree isotherm, and consequent melting of glaciers.
6. The real estate development known as El Quillayal is located on the south east bank of the Colorado River, and consists of lots for houses owned by those who purchased their properties due to the area's scenic beauty. Most of these properties will decline in value due to intervention under the project. This has not been taken into account by the Project Owner, as a factor that will lead to clear harm to the rights of third parties - an impact that should be addressed through some form of mitigation, compensation, or reparation.
7. With reference to tourism projects, the Instituto Río Colorado should be mentioned, as it will be seriously affected by the project. It should also be mentioned that a project exists to create a sanctuary, the "COLORADO RIVER SANCTUARY", which constitutes a significant development project for the district with the creation of some 40 local jobs. However, these existing situations were not taken into account by the Project Owner, which does not include them in its baseline, and similarly fails to describe potential impacts, or measures that will be taken.
8. A number of families living in the settlements of Maitenes and El Alfalfal earn their livelihood through tourism activities such as horse rides and guided hikes through areas close to the sites where project installations are to be constructed (including some state-financed activities, such as the Turismo los Quempos small business), yet the Project Owner has not taken this situation into account in preparing the EIS - it is not included in the baseline, and therefore potential impacts on such activities are not described.
9. The company presents an ethnographic study that makes a number of generalizations based on interviews made with key focus group members in the community. However, the study exhibits features that are utterly outlandish for a study of this kind, as it ignores the diversity currently present in the area known as the Cajón del Maipo.
 The decision to raise the profile to the livestock industry to make it appear to the main activity conducted by members of the most traditional families serves to conceal thousands of persons currently working in other sectors such as tourism, trade, etc.
 The Project Owner must present a serious and unbiased study addressing all social and economic productive activities undertaken in the Maipo Valley areas, that would be directly or indirectly affected by the Project.
 It should be pointed out that the study presented includes a large number of deeply debatable reductionist statements regarding the manner in which the relationship with the place that persons have chosen to live in is managed and founded.
10. The Project Owner is requested to present a cartographic survey of tourism activities that will be affected by works

Arenas, or the roads running from Engorda to the Marmolejo and Volcán San José mountains, which will be affected by project works, and similarly no information is provided regarding the El Morado Lake; these areas are visited by a significant number of tourists, including foreign visitors and Santiago residents, located in the Area of National Tourism Interest and, as stipulated by decree by this district, and which results in an obligation to evaluate all activities that plan to cause "Significant alteration, in terms of magnitude or duration, of the tourism or landscape value of an area", as stipulated in Article 30 of the Environmental Base Law..

In view of the above, the Project Owner is requested to provide a more precise definition of the area's value for tourism, and to declare the level of impact to be suffered, as well as any measures that will be taken to prevent such impact.

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

AGU.01 Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum**.

1. CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plant (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfafal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **PRO The Project**

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1) **Chapter 3 of the EIS** provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

PRO.01.01 Compensation

The concept of compensation refers to the act of indemnifying damages or harm caused. Within the framework of the EIS, the Project Owner has issued a proposal to the competent authority regarding a suite

of environmental management measures aiming to minimize, compensate, and restore the Project's impacts, making their implementation sustainable (Chapter 6 of the EIS). In this regard, compensation is understood to be included in the spirit or end goal of the environmental management measures proposed by the Project Owner, following the evaluation of the direct and indirect effects of the PHAM on each of the environmental components stipulated in Supreme Decree 95, SEIA Regulations.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district. In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district. During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. In parallel, the study investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.01 River sports

During the operations phase, the activities of the PHAM shall not directly or indirectly interfere with tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. Furthermore, the PHAM shall have no significant effect on boating activities on the Maipo River as a result of reductions in river flow rate; an analysis is presented in Annex 17 of the Addendum modeling a number of hydrological scenarios (1), concluding that the PHAM shall not affect the current situation in rafting and kayaking activities conducted in the area between San Gabriel and San José de Maipo.

In order to establish an analysis comparing the current Maipo River boating situation with predictions for the situation with the Project operational, the variables of flow rate, river width, and water depth were modeled, as valid indices to establish conditions for boating activities on the Maipo River.

This analysis showed that the Project shall not interfere with tourism activities conducted on the Maipo River, in view of estimates that in a dry year, the magnitude of variations in flow rate and water depth will not cause interference with boating activities.

For more information, see **Annex 17 of Addendum 1**.

- (1) The hydrological analysis used to evaluate reductions in flow rate is based on a statistical record going back 50 years, thus ensuring that seasonal and annual variations are incorporated into the analyses conducted.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be

used, which, combined with the suspension of project-related traffic flow during weekends as well as

other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 373

F. REMARKS ON RISK SITUATIONS

1. With regard to the forebay to be built in the Aucayes Stream Basin, at the Hacienda Río Colorado, the Project Owner does not present a detailed technical proposal or information on variations in the area's natural state resulting from the construction of the forebay, such as impacts on the geological structure of the Aucayes Stream, the basin's hydrological dynamics, and the abundant plant and animal life that exists in the area; similarly, no information is provided regarding the potential risks caused to the environment and local residents as a result of leaks, overload, or overflowing during the operations phase. This information is particularly important in view of the presence of high-value plant communities in the Aucayes Stream system, and the location of the settlement of Maitenes at the base of the stream - in an area that the Project Owner itself defines as a zone of mass flow removal. In the event of a transient phenomenon, and in view of the Project Owner's assurances that this forebay will not overflow, what would happen in the event of the abrupt closure of stoplogs or valves? The Project Owner is reminded that the town of Los Maitenes is located on one bank of the Aucayes Stream, and is in a high risk situations in the event of landslides or flash floods - an issue that the Project Owner has unduly belittled.

Thematic responses

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

RSG Risk

The Project Owner possesses a general risk prevention strategy that imposes certain measures on the Project during its different stages of advance. This strategy features the following components:

- a) Measures incorporated into the Project's engineering design.
- b) Systematic verification of compliance with applicable regulations
- c) Establishment of restricted areas
 - c.1) Area restricted due to their archeological, paleontological, or heritage value
 - c.2) Area of natural value that requires protection by the Project
 - c.3) Officially protected area.
- d) Expert supervision during construction
- e) Training regarding environmentally sensitive issues
- f) Internal risk management and accident prevention programs
- g) Separation of works installations and encampments

For further information on each of these points, please see **Chapter 7 of the EIS**, which specifies the **Environmental Management Plan**, the **Risk Control and Prevention Plan** designed for the Project, the safety measures to be adopted in light of the risks identified, and, finally, the **Accident control plan**, to be activated in the event of the failure of the preventive measures taken by the Project Owner. Furthermore, **Annex 32 of the EIS** presents the **Risk and Contingency Prevention Plan** for contractors.

RSG.01 Load rejection

During the operation of the power plants, situations may arise that necessitate the stoppage of one or both plants for a certain period of time. Two temporary phenomena occur at such times, the effects of which must be analyzed. These phenomena are mass oscillations within tunnels carrying water under pressure, and impact on the Maipo River system's flow dynamics.

A special situation arises in the operation of a hydroelectric plant when a sudden stoppage occurs affecting its power generation units or discharge spillways. Load rejection can arise as a result of automatic shutoffs caused by internal or external failures:

- Internal. These situations relate to technical problems within the power plant that

require the stoppage of the turbines. This can arise due to This can arise due to a mechanical failure (valve or turbine failure) or an electrical fault in the mechanisms that operate the generator units, or in the high tension switchgear (switches or power line distributors).

- External. External events can lead to total system failure (black out), which is a less frequent situation. This can be caused by a break in the power transmission line that serves both power plants.

Fortunately, such events are infrequent; by way of illustration, see **EIS Annex 17, Table 3.1**, which shows a summary of load rejections that occurred at the Alfalfal Power Plant from 2004 to 2007.

For further information on the analyses taken into account for different potential cases of failures in the power generation units in the Alto Maipo plants, please see **Annex 17 of the EIS and Annex 16 of Addendum 1**.

Remark N° 374

G. REMARKS ON UNDECLARED IMPACTS AND OTHER GAPS IN THE STUDY

Notwithstanding the large number of gaps in the information presented in the different components of the study, this section relates particularly to aspects that are completely omitted by the Project Owner.

1. The general layout of the Alfalfal Tunnel takes it underneath the land holding known as Predio San Francisco de Lagunillas, although the Project Owner does not provide information regarding the environmental conditions of this area of land, or the characteristics of the project works to be implemented there, hydrological and geological characteristics, projected impacts, and environmental or restriction measures.

The Project Owner is therefore requested to provide a characterizations of the area, and the project works planned for implementation there.

It should be pointed out that the San Francisco de Lagunillas Land Holding, which is to be subject to intervention with the new proposed layout, forms part of the system of Metropolitan Region Priority Biodiversity Conservation Sites, as set forth in the Andean Santiago Action Plan, established in Exempt Resolution W 585 passed in 2005 by COREMA RM.

Additionally, the layout passing through the San Francisco de Lagunillas Land Holding passes through the deep gorges of the Peladeros and Piuquencillos mountains, which nourish the headwaters of the Vega Quemada, Calabozo, Rosario, Del Medio, and Las Quinguas Streams, as well as feeding water into the meadows/wetlands of Santa Teresa, Rincón de los Turistas, Pedernalillo, and La Tetona, and the Llanos and Laguna Barrosa wetlands.

The Project Owner should provide complete information on this area of land that will be subject to intervention, identifying mountains, creeks, streams, meadows/wetlands, lakes, and the area's hydrological network. The Project Owner should conduct a study to characterize this area of land that will be subject to intervention, specifying the geological and hydrological conditions of the entire area at all depths, as well as the interactions between this hydro-geological unit and the San José Stream, which it feeds into, covering impact on flow rates in the San José Stream - which is a significant tributary of the Maipo River. The Project Owner should include detailed topographic cartography of this area.

2. The proposed layout for the Alfalfal II tunnel will also affect a part of the Hacienda Río Colorado Land Holding, regarding which sufficient information is not available. The project Owner should provide a study characterizing the influence of the Alfalfal II Tunnel on the Hacienda Río Colorado, in the upper Aucayes Stream basin, which has been expanded with a further three tunnels (General Layout, sheet 1) not considered in previous versions of the project. The Project Owner should include detailed topographic cartography of this area.
3. The Project Owner is requested to attach maps showing the area's topography, with information on local meadows and springs, and the glaciers of the Piuquencillos mountain.
4. The project documentation does not cover a closure or abandonment phase, thus flagrantly contravening the stipulations made in Article 12 part c), subsection 4, in the SEIA regulations, which specifies that all projects submitted to the SEIA must describe closure or abandonment phases, specifying the actions to be taken. AES Gener makes only the most general statements in this area, stating that the useful life of the project may be in excess of 50 years. However, the documentation provides no point-by-point analysis of this major phase in the project, and thus seriously infringes the regulations stipulated, as by failing to include a closure phase, actions to be taken the end of the project's useful life are left up to chance. Such project documentation is not suitable for submission, as any project that does not specify its closure/abandonment phase cannot be approved by COREMA, as such approval would leave the project's closure as a problem to be solved in the future - failing to take into account that any requirements not made in the Environmental Qualification Resolution would not be binding for the company; it would not be obliged to implement a closure and/or abandonment phase, and the costs associated with the closure of the project would become liabilities that would have to be taken on by the State or by private interests in the future - this is not acceptable. It should be made clear that this failing is not only a flagrant breach of the law, but that it also directly prejudices as yet unknown persons who shall have to pay the costs that rightly should be paid by the Project Owner - which is unlikely to show the same willingness that it has evinced during the approval phase, when the time comes to implement the project's closure; it is therefore vital that closure actions be specified now.

Thematic responses

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.02 EIS Additional and Complementary Information

In accordance with consultation procedures conducted by oversight services, further studies and information have been incorporated into Addendum 1, which complements existing information

provided in the EIS. Regarding ecological flow rates (**Annex 17**), cultural heritage (**Annex 14**) and the management of summer grazing areas (**Annex 6**).

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

PRO.03.02 Tunnels

The majority of the Project is planned for installation underground. The general characteristics of the tunnels are described in Chapter 2 of the EIS, Table 2.2.5 (for detailed geological information on the path taken by the tunnels, see Annex 46 of the EIS).

For an evaluation of the impact and environmental management measures associated with underground installations, see Chapter 6 of the EIS.

Annex 45 of the EIS, Hydro-Geology of Underground Works, presents a general description of the geological conditions that are expected to be found along the lengths of the tunnels; expected permeability based on geological knowledge and hydro-geological conditions in the area, incorporating experience gained during the construction of tunnels for the Alfalfal Plant, which has been operative for more than 17 years; as well as a description that includes the design of the tunnels, providing a brief explanation of the methods to be used to reduce and control water seepage.

With regard to the impact of the path taken by the tunnel passing underneath the El Morado Natural Monument, and measures to be taken to respect the area, see Section I, Responses 4, 5, and 6, in the Addendum.

PRO.03.05 Abandonment plan/Destination of post-works constructions

Gener has specified a complete and rigorous program for the closure and removal from the area of temporary installations, and subsequent cleaning and/or restoration of areas occupied on a temporary basis.

The installations that will be used during the construction phase and subsequently removed or dismantled will be the encampments, site installations, and platforms installed on a temporary basis for access at work sites and for the placement of other, smaller installations.

The entire areas occupied by encampments and site installations shall be restored, while at tunnel exits/entrances an access road and a small work space (approximately 400 m²) must be left at the site for minor auxiliary installations.

Abandonment of works: given that most of the works/installations to be created under the PHAM will be temporary (encampments and site installations, during the construction phase), in this regard attention is paid only to the muck disposal heaps, which shall be built using the application of carefully designed and selected techniques to prevent the possibility of landslides and landslips when they are abandoned. The muck disposal heaps will be built up in an organized manner, forming level and safe platforms, with slopes at the sides with the natural gradient formed by the material in question, thus ensuring stability. Finally, the muck disposal heap will be covered over with topsoil (extracted previously from the same site), and this surface shall then be restored with natural plant coverage in low altitude areas, thus permitting the final closure of the muck disposal heap.

Project closure and restoration activities for the areas used on a temporary base shall be included as contractual requirements demanded of contractors. For detailed information see the EIS, Annexes 6 and 29.

Remark N° 375

H. TRANSMISSION LINE

As you are well aware, the Alto Maipo Project includes the ownership, financing, construction, and operation of two run-of-the-river hydroelectric power plants to be located in the Metropolitan Region, as well as ancillary installations for the operation of these plants, and the construction of a single transmission line to transport the electrical energy and power generated from the plants, located in the high Andes, to a point of connection with the Central Grid (SIC). In Section 1, INTRODUCTION, of the Environmental Impact Study presented by the Project Owner to COREMA, Metropolitan Region, for environmental impact assessment, the following assertions are made:

"This document contains the Environmental Impact Study (EIS) of the Upper Maipo Hydroelectric Project (hereinafter, PHAM), the Project Owner of which is the company AES Gener S. A. The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River. Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of very long tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation. The energy generated will be transmitted to the Central Grid (SIC) through an electricity transmission system, which does not fall within the scope of this EIS. "

In view of this statement, it cannot be denied that the EIS lacks the point-by-point description of the project required under Article 12 of Law 19,300 - obviously, this description ought to be complete. This leads to the conclusion that the baseline is necessarily incomplete, as it does not address a fundamental part of the project - the power transmission line, which is an absolutely necessary component of the project, to transmit the electricity produced in the hydroelectric power plant to the Central Grid.

1. Legal obligation to prepare a single EIS

Article 19 part 8 of the Chilean Constitution establishes a duty to preserve and protect nature. Meanwhile, the Environmental Base Law, Law 19,300 (the LBMA) is one of the laws whereby the State seeks to comply with this duty. Article 10 of the LBMA states that:

"Projects or activities that may cause an environmental impact, during any of their phases, and which are subject to the environmental impact evaluation system, are as follows:

- a) *Aqueducts, reservoirs, and water conduits, which must be authorized as established in Article 294 of the Water Code, dams or dykes, drainage, drying, dredging, defense or alteration, affecting significant bodies of water or natural watercourses;*
- b) *High voltage electricity transmission lines and associated substations.*
- c) *Power plants with rated output greater than 3 MW."*

In addition to the stipulations set forth in this requirement, compliance must be made with Supreme Decree N2 95, Environmental Impact Assessment System Regulations (hereinafter, LBMA Regulations), sub-article 32 defines and helps determine whether or not a project falls within the remit established in Article 10 of the LBMA. Article 11 of the LBMA stipulates that projects included under Article 10 of the same regulation all and equally require the submission of an EIS when certain "effects, characteristics, or circumstances" apply. Thus, part one of the article states that:

"Projects or activities shall require the preparation of an Environmental Impact Study if they generate or lead to at least one of the following effects, characteristics, and circumstances:

- b) *Significant adverse effects on the quality and quantity of renewable natural resources, including soil, water, and air;*
- c) *Resettling of human communities or significant changes in the ways of life or customs of human groups;*
- d) *Localization close to a settlement or protected natural resources subject to impact, as well as the environmental value of the area in which they are planned to be implemented;*
- e) *Alteration of the area's landscape or tourism value, of significant magnitude or duration; and*
- f) *Alteration of monuments, sites with anthropological, archeological, or historic value, and, in general, sites belonging to cultural heritage.*

This project meets all requirements established in the aforementioned regulations, and therefore must pass through the Environmental Impact Assessment System with the approval of a single EIS that takes in the ENTIRE project - that is, the hydroelectric plant, associated installations, and the associated transmission line, so that the environmental authorities can gain a full understanding of the project's entire real-world impact.

2. Obligation to describe a clear baseline for the area of influence

Article 2 part i) of the LBMA, defines an EIS as:

"A document that provides point by point details of the characteristics of a project or activity planned to be implemented or modified. It should provide documented background information that can be used to predict, identify, and interpret its environmental impact and describe the action or actions that it shall take in order to prevent or minimize all significant adverse effects."

of a project (Article 2 part i and Article 12 parts b and c of the LBMA). According to the Diccionario de la Real Academia de la Lengua Española (which is applicable to Chilean jurisprudence to specify the content and scope of words used in laws), "point-by-point" should be understood to mean "precisely", "without omitting any circumstance or specific feature"; meanwhile, part b) of Article 12 of the LBMA specifies the required parts of an EIS to include a "Baseline", and part 1) of Article 2 defines a "Baseline" as:

"... a detailed description of the area of influence of the project or activity, prior to its implementation"

In other words, the requirement stipulated under the LBMA demands that the environmental authorities are provided with fully detailed information on the existing situation prior to the implementation of the project, throughout the area that it will affect. Article 12 part b) of the LBMA, which stipulates the requirement for a baseline, does not affect the applicability of part c) of the same article, which specifies the minimum content for an EIS, requiring:

"A point-by-point description of the effects, characteristics, or circumstances indicated in Article 11 that give rise to the need to submit an EIS."

As mentioned above, the "effects, characteristics, or circumstances" specified in Article 11 include:

- Significant adverse effects on the quality and quantity of renewable natural resources, including soil, water, and air;
- Resettling of human communities or significant changes in the ways of life or customs of human groups;
- Localization close to a settlement or protected natural resources subject to impact, as well as the environmental value of the area in which they are planned to be implemented;
- Alteration of the area's landscape or tourism value, of significant magnitude or duration;
- Alteration of monuments, sites with anthropological, archeological, or historic value, and, in general, sites belonging to cultural heritage.

It is with regard to these precise effects that the law requires detailed descriptions. Therefore, the content of the EIS is determined in accordance with the "effects, characteristics, or circumstances" mentioned in Article 11, and not by the type of project as established under Article 10 - which only serves to determine what class of project must pass through the SEIA system as specified in Law 19,300. In conformity with Article 2 part i) of the LBMA, an EIS must provide documented background information forming the grounds for the prediction, identification, and interpretation of the environmental impact of the project. It is therefore important that adequate compliance is made with the requirements specified in Article 12 part b) of the same law, in terms of clearly establishing a "baseline". This baseline should relate to the entire area of influence of the project, which, in the specific case of the PHAM, will also include the areas where associated works are built, including the transmission line that will be used to transport electrical energy and power generated at the project's plants. The importance of correctly establishing the baseline is a fundamental issue for the analysis of the project, as it indicates all of the sites that may suffer in any way from the effects of the project - which must be analyzed in detail, prior to implementation. However, in this case two different EIS studies are being submitted, one for the PHAM and the other for the transmission line; this will render it impossible for the environmental authority to gain an understanding of the true magnitude and scale of the project's real-world impact on ecosystems, diversity, and persons inhabiting the Metropolitan Region, all of which factors will necessarily be affected by the works and activities included in the PHAM, taken as a whole. These works clearly form part of the same project, and should therefore be evaluated alongside it. Indeed, an electricity generation project cannot be conceived without a transmission line to carry this electricity to the Central Grid. Furthermore, this transmission line will be constructed as a direct consequence of the power generation project described above. In other words, the two construction activities are different stages in a single, monolithic project.

3. CONAMA opinion

In this regard, CONAMA, in its "Environmental Impact Evaluation Manual, concepts and background (1994)", makes the following statements:

"An EIS must be evaluated based on the entire activity proposed; a single EIS must therefore be drawn up, and this study cannot be broken down into aspects, parts, or territories. This allows the consideration of synergistic effects that may appear as a result of the interaction of the parts; such effects may be hidden from view if a number of smaller-scale studies are evaluated independently."

The submission of two, separate EIS studies for the activities that together form the PHAM would fly in the face of the opinions of the highest-level environmental authority, as such actions would render it impossible to gain a suitable perspective on the impact that will result from the entire project, and consequent negative consequences.

4. Reference to a similar case:

The Cascada Chile case and the opinion issued by Pablo Ruiz Tagle Vial. Reference should also be made to a case that is somewhat similar to that of the Upper Maipo Hydroelectric Project, which provides a clear basis to resolve any doubt regarding the activities that form an integral part of the project: the Cascada Chile case. This project was drawn up by Compañía Industrial Puerto Montt S.A. (CIPM S.A.), a partnership between the US company "Boise Cascade" and the Chilean company Maderas Cóndor S. A., one of the basic objectives of which was the construction and operation of an industrial plant for the production of OSB boards and a sawmill, with the aim of sourcing raw materials from the native woodlands of Chile's Region X. The installations were to occupy an area of 177 hectares located in the district of Puerto Montt, province of Llanquihue, Region X, with physical constructions in Bahía de Iique, some 20 kilometers south-west of the city of Puerto Montt. According to the EIS submitted to the environmental authority by CIPM, the company's main consumption of raw material was to be 925,000 cubic meters of suitable native timber available year round, all sourced exclusively in Region X, meaning that lumber requirements would amount to close to 6,000,000 trunks or trees, equivalent to the clear felling of over 5000 hectares of native woodland each year. The plant planned to use a minimum of 67% of the native lumber that it was to receive for the production of 600,000,000 board feet of board each year, making use of the rest for the production of chipboard.

The project was submitted to the SEIA, and in late 1999 COREMA X Region issued Exempt Resolution N° 25/99, authorizing the implementation of the project.

Given that this resolution approved the project without evaluating its impact on native woodland resources to be used - in other words, throughout its entire true area of influence - despite remarks tabled during the citizen consultation process, a number of non-governmental organizations tabled motions with the body specified in Article 14 of the Environmental Cooperation Agreement between the Government of Chile and the Government of Canada (ACACC), the Commission for Environmental Cooperation between Canada and Chile, motivated by the lack of effective application of environmental legislation in this case by the Chilean environmental authority.

Although the filing itself was not accepted because the Committee for the Review of Requests on the Agreement on Environmental Cooperation between Chile and Canada deemed that the case did not merit the preparation of a factfile because the foreign investment partner, Boise Cascade, decided not to implement the Cascada Chile project, and made this position clear in advance of the decision by the body concerned, we here wish to highlight the fact that the following statement was issued by the committee, comprising David Johnson for Canada and Pablo Ruiz Tagle Vial representing the Chilean state, which we consider to be of relevance with regard to the line of argument along which we are here proceeding:

"This is not the first time that the correct exercise of discretionary powers has been subject to review, inasmuch as it related to decisions made regarding the scope or scale of the project. This specific point has been addressed in the courts of a number of countries, which have established that, in accordance with applicable environmental legislation, criteria such as interdependence or linkage may exist between different projects. For instance, it has been resolved that INTERDEPENDENCE EXISTS WHEN A PRINCIPAL PROJECT COULD NOT BE IMPLEMENTED WITHOUT IMPLEMENTING ANOTHER PROJECT, OR WITHOUT UNDERTAKING A PHYSICAL ACTION OR ACTIVITY, SUCH THAT THIS ACTION MAY BE CONSIDERED TO BE A COMPONENT INCORPORATED INTO THE SCOPE OF THE PRINCIPAL PROJECT. In reaching such a decision, the courts have taken into account whether a project lacks an independent purpose, or whether it is inextricably linked to another project".

Adopting a different perspective, even if a distinction were to be made between the "Upper Maipo Hydroelectric Project" and a "Transmission System Project", separating the activities of generating and transmitting electrical energy - as the Project Owner maintains - we would similarly arrive at the conclusion that the works and activities of the two projects are inter-related, such that there would be NO PURPOSE IN IMPLEMENTING ONE WITHOUT THE OTHER; they should therefore be considered to be integral parts of a single, monolithic, overarching project.

5. Comparative law and judgments of foreign courts in the field

It strikes us as interesting to review the situation of hydroelectric projects in other countries, examining the different aspects that should be included in the Environmental Impact Study for a hydroelectric power project under these legislative systems and bodies of jurisprudence. This will permit us to determine whether an obligation exists to submit a single project

for the impact of both dams and transmission lines. In the United States, the Federal Energy Regulatory Commission (FERC), which oversees licensing for most of the country's hydroelectric projects, has extensive regulations regarding required content for requests and environmental impact studies

for projects involving new dams. Under these regulations, interested parties must provide information on the environmental impacts of their planned projects, and must describe all associated installations - including dams and transmission lines.

It should be born in mind that application procedures do not specify the content of the EIS, but do determine the information that those submitting projects must include in their applications for the licenses necessary for the construction of a hydroelectric project.

The procedures for the application are established in Regulation 18 of the Code of Federal Regulations (C.F.R.) section 4.41, which indicates that when a hydroelectric project plans for the construction of more than one dam, each dam must be fully described - as must information regarding transmission lines. In this regard, 18 C.F.R. sec 4.41 part b) stipulates that the description of the dam must include:

- "(1) The physical composition, dimensions, and general configuration of any dams, spillways, penstocks, powerhouses, tailraces or other structures proposed to be included as part of the project; (...)*
- (4) he number, length, voltage and interconnections of any primary transmission lines proposed to be included a part of the project .*
- (5) The description of any additional mechanical, electrical, and transmission equipment appurtenant to the project; and*
- (6) All lands of the United States, including lands patented subject to the provisions of section 24 of the Act, 16 U.S.C. 818, that are enclosed within the project boundary described under paragraph (h) of this section (Exhibit G), identified and tabulated by legal subdivisions of a public land survey, by the best available legal description. The tabulation must show the total acreage of the lands of the United States within the project boundary."*

Meanwhile, regulation 18 C.F.R. 4.41 (f) specifies the content of the "environmental report" that the party proposing the project must submit as part of its application package. This section of the regulation is too long to reproduce here in its entirety, but in any case it must be born in mind. Similarly, regulation 40 C.F.R. states that the Environmental Quality Council, as established in the EIS law, applicable to the FERC, indicates that the environmental impacts "of joined (connected) actions" such as additional dams or transmission lines should be described in the EIS for a dam project. According to the same regulation, the scope of environmental impact declarations should be determined by agencies taking into account three types of actions, three classes of options, and three types of impacts. The actions in question are "united actions",

which means that they are closely related and therefore should be discussed in the same impact statement. Actions are connected if they::

- (i) Automatically lead to other actions that could require environmental impact statements.
- (ii) Cannot or will not proceed unless other actions are taken previously or simultaneously.
- (iii) Are interdependent parts of a larger action and depend on the larger action for their justification.

Council on Environmental Quality) establish, in section 1508, the different effects or impacts that could exist between projects presented:

- (a) Direct effects, which are caused by the action and occur at the same time and place.
- (b) Indirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.

Effects and impacts as used in these regulations are synonymous; additionally, "Indirect effects" may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems. Additionally, under these regulations the term "effects" includes ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative.

In Spain, EIS documents for dams must include indirect or cumulative impacts, such as impacts from transmission infrastructure. Finally, it is sufficient to state that in other countries such as Belize and India the situation is largely similar, as the same principles are adhered to for most dam projects. Thus, all Environmental Impact Studies on dams must include not only the impact of the dams themselves, but also a section on the transmission lines whereby the electrical energy that they produce is transported.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the

dynamism of all activities in the District of San José de Maipo; iii)
Improvement in quality of life for many families, as family members
return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **ELE Electrical Installations**

The electrical installations presented in the EIS comprise the substation, to be located in the El Sauce area, the characteristics of which are to be found in **Annex 27 of the EIS**; given that the electricity transport layout (cabling and towers) is to be presented to the Environmental Impact Assessment System once all background information is available.

ELE.03 Transmission lines

In view of the project's location, close to Santiago, it is expected that the distance covered by the definitive cabling layout will be short, involving a minimum of sectors not subject to prior intervention. With regard to the specific location of the cabling layout, plans call for the use of the existing high tension power line used by the Queltehues, Volcán, and Maitenes Plants.

Once the layout of the high tension power line has been defined, the Project Owner will submit this plan to the Environmental Impact Assessment System, in accordance with legislation in force. In line with the development of the Compliance Plan for environmental legislation applicable to the Project, the General Regulations applicable in this instance are indicated below:

Decree with Force of Law N°4, dated 05 February, 2007, setting forth the Recast, Coordinated, and Systematized Text of the General Law on Electrical Services.

The General Law on Electrical Services governs the generation, transmission, distribution, and regimen of concessions and tariffs applicable to electrical energy, and the functions of the State with regard to these areas.

Supreme Decree N° 327, Regulations Regarding the General Law on Electrical Services

The Regulations Regarding the General Law on Electrical Services establish, in their 8th Article, that hydroelectric power plants, electrical substations, and transmission lines may be installed without making a request for a concession, when the interested party wishes. These concessions may be provisional (in order to study projects) or definitive. A definitive concession is granted by a supreme decree issued by the Ministry of the Economy, by order of the President of the Republic. Permits relating to electrical installations that do not require concessions are granted by the corresponding Municipal Governments.

For further information and analysis on the aforementioned regulations, with regard to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see **Sections 3.1.6 and 3.1.7 of Chapter 3 of the EIS**, where more detailed versions of this information can be found.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1)

Chapter 3 of the EIS provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

PRO.02 EIS Additional and Complementary Information

In accordance with consultation procedures conducted by oversight services, further studies and information have been incorporated into Addendum 1, which complements existing information provided in the EIS. Regarding ecological flow rates (**Annex 17**), cultural heritage (**Annex 14**) and the management of summer grazing areas (**Annex 6**).

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 381

EIS

1. EIS. If you read the project documentation presented to CONAMA on May 22, you will see that its information on the project baseline, and the section on identification, prediction, and evaluation of environmental impacts to be generated in our area, are not mentioned - particularly with regard to our irrigation system. Similarly, it fails to address mitigation actions, much less establishing commitments to solve our problem, or compensation to which our community will have a right if it is affected. This is not an accidental lapse, as we have repeatedly informed both the Project Owner and the pertinent authorities of our requirements, starting in June 2007, when the PHAM was submitted to CONAMA for the first time.

Given that the principal functions of CONAMA include "Administration of the EIS System", why is it permitted that a project be resubmitted when it **intentionally omits its impacts?**

By definition "*An EIS should provide documented background information that can be used to predict, identify, and interpret its environmental impact and describe the action or actions that it shall take in order to prevent or minimize all significant adverse effects, so that, based on this background information, the project can be evaluated*". If the approval of this project is dependent on COREMA, we must assume that COREMA is expected to magically guess this impact in order to table its observations. What if it lacks the powers of the soothsayer? This clearly shows that the system as it is currently used is not efficient; that it is a system that can and should be improved, as the question of whether the correct information reaches those who are to make decisions regarding the approval project cannot be entrusted to the community, but rather relies on the EIS. The inclusion of omissions, distortions, and falsified data in a EIS with the aim of obtaining an RCA, without accepting the cost of the impacts concerned, should be seen as a crime and sanctioned as such. CONAMA, in its role as the administrator, should not only reject the resubmission of a project that demonstrably contains intentional omissions, it should also apply sanctions against this situation.

Citizen Participation Meetings At these meetings the Project Owner makes presentations, and this presentations are riddled with omissions, distortions, and bare faced lies. This fact has been observed by all of those present, including CONAMA, should be cause for drastic sanctions, and not aided by silence on the part of CONAMA, the role of which is limited to moderating these meetings and keeping the minutes. If a person attends in order to find out about the project, what information will they take away from the meeting? Who acts as guarantor for these processes? We understand that the system is structured in this way, but it is also clear that an evaluation is sorely needed, in terms of efficiency and transparency.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in **Chapter 2 of the EIS.**

AGU.02.01

Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las

Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will

be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

OTR Other

This section relates to certain special situations that could not be categorized, or that are linked to specific requests, disqualifications, or situations that feature a clear political component, against either the environmental authority or the Project Owner.

OTR.02 CONAMA

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.02 EIS Additional and Complementary Information

In accordance with consultation procedures conducted by oversight services, further studies and information have been incorporated into Addendum 1, which complements existing information provided in the EIS. Regarding ecological flow rates (**Annex 17**), cultural heritage (**Annex 14**) and the management of summer grazing areas (**Annex 6**).

Remark N° 382

4. EFFECTS, CHARACTERISTICS, OR CIRCUMSTANCES UNDER WHICH

AN EIS MUST BE CONDUCTED UNDER ARTICLE 11 OF LAW 19,300

The project has submitted an EIS to the SEIA in view of recognized environmental impacts as specified in subsections b), d) e) f) of Article 11 of Law 19,300. In terms of items of interest to this Neighborhood Watch Group, the study fails to adequately address the effect, characteristics, and circumstances of the environmental impacts specified in subsection b) of that article. Article 11 b) states that projects must present an EIS if they carry a risk of significant adverse effects on the quality and quantity of renewable natural resources, including soil, water, and air. Meanwhile, Article 6 of the regulations on the law indicates that the Project Owner must submit an environmental impact study if its activity or project generates significant adverse effects on the quality and quantity of renewable natural resources, including soil, water, and air. The same article adds that: *"In order to assess whether the aforementioned significant adverse effects are a point of concern, consideration will be given to: o) the area of soil that may be lost or suffer degradations through erosion, compaction, or contamination"*

The EIS presented by AES Gener fails to address the 2.7 million tons of aggregates per year that will be subject to intervention as a result of the implementation of the project, which will aggravate erosion and streambed erosion in the Maipo River, as indicated below.

Annex 20 of the PHAM EIS contains the Maipo River Sedimentation Study, prepared for AES Gener in March 2008 by the Civil Engineering Department at the Universidad de Chile. According to this study, the PHAM will lead to a drop in the river's total aggregates production capacity of the order to 22%, as against current capacity. In particular, in the San Bernardo area the reduction is estimated at approximately 19% as against available streambed erosion without the project. The same study indicates that current aggregates production rates in the Maipo River, *"would apparently fall within the limits of sustainability"*

(...) Therefore, if the predicted reductions in sediment availability downstream of the Independent Intake implemented by the project come to pass, then although these variations are relatively minor, they may lead to local problems if measures are not taken to ensure more rational management of the watercourse"

In the context of current aggregates extraction rates in the Maipo River, the Project Owner's indication that rates would "apparently fall within the limits of sustainability" is based on ways of thinking that have been relegated to the past, as under the current scenario the riverbed is clearly undergoing a process of degradation. This means that riverbed levels are eroding downwards, in

an uninterrupted trend that has no clear end in sight. This is made clear from the set of photographs attached as an exhibit to show how the main channel of the river has eroded downwards by 4 to 5 meters. It is therefore clear that the concept that changes "apparently fall within the limits of sustainability" largely ignores the current situation, and is far divorced from reality. Warning of this phenomenon has already been provided, in the study "The river and its tributaries as the main source of aggregates for the Metropolitan Region and Regions V and VI" commissioned by the Ministry of Public Works in 1998, which concludes that the river is currently overexploited.

In this context, to indicate that a 19% drop (for the San Bernardo area) is "relatively light" is a gravely imprecise statement, as when a limit is surpassed, any aggravating factor may rapidly lead to severe consequences that are often irreversible - and the costs of which, in the situation described, would be born entirely by third parties and not by beneficiaries of the PHAM. It is considered indispensable that AES Gener S.A. must conduct studies necessary to evaluate the project's effects on irrigation water intakes, including a hydraulic analysis - and that these studies should be used to draw conclusions leading to the proposal of mitigation measures.

This riverbed erosion process has severely affected irrigation water abstraction installations owned by members of this neighborhood group. Specifically, the intakes that have been affected are those of the Arriagada and Huidobro channels, and the main channels owned by the Buin United Channel Associations and the Maipo Channels Association. The network of channels that draw their water from these intakes are used to irrigate approximately 50,000 hectares. As a result of the continuing downward erosion of the riverbed, in recent years the owners of these channels have been forced to make major investments to increase the depth of the foundations of these intakes - as the erosion of the substrate has left many foundations exposed, leaving them vulnerable to destruction the next time that the river rises. Investments have totaled over CLP \$950,000,000. The risks associated with overproduction of aggregates are not limited to dangers of undermining these irrigation facilities, but also threaten the stability of major transport infrastructure works that cross the Maipo River, such as the bridges that cross it on the Maipo Highway, the old highway bridge, and the railway bridge.

This situation has been recognized by the competent authorities, in this case the Department of Hydraulic Works (hereinafter DOH), as shown in the following documents, copies of which are attached:

- DOH RM Communication N° 268, dated March 29, 2006, sent by the then Metropolitan Region Director of Hydraulic Works, Emilio Torres Valdebenito, to the Mayor of Buin. The Communication reminds the mayor of the request made in DOH Communication 1114, dated November 2, 2005, which requested all available information on aggregates extraction activities in the district. The communication requests a full response by April 10 of that year for the submission of background information, and warns that the DOH will not provide technical approval for any projects if this information was not submitted, implying the prohibition of aggregates extraction.
- DOH RM Communication N° 462, dated May 24, 2006, sent by the Metropolitan Region Director of Hydraulic Works to the offices of the mayors of Buin and San Bernardo, expressing "concern regarding the undermining of the foundations of the bridges that cross the Maipo River on the Maipo Highway, the old highway bridge, and the railway bridge". This communication adds that the DOR "is engaged in analyzing other structural and non-structural actions to increase the levels of stability possible in this stretch of river, given the vital importance of the bridges located along it." Amongst non-structural measures under consideration, it mentions "the prohibition of aggregates extractions during certain seasons until it can be verified that a new river mechanics equilibrium exists in the area, affecting a stretch of river running 4 kilometers upstream and downstream of this system of bridges".
- DOH RM Communication N° 872, dated September 12, 2006, sent by the Metropolitan Region Director of Hydraulic Works to Ms. María Pulgar Riedmann, of Áridos Buin Ltda., in which

dated March 29, 2006 and Communication N° 462 dated May 24, 2006), "is presented in the context of ordinances and restrictions that this Water Department has determined to be urgent, in order to move rapidly to neutralize the erosion processes in progress in the Maipo River watercourse, particularly in the surroundings of the road and rail bridges that were at the point of collapse late last year."

- Communication 511 dated May 16, 2008, sent by the current head of the RM DOH to the Director of the Environmental Commission CONAMA RM, regarding a "Maipo River aggregates extraction project, Route 5 South KM 1.8 to 4.2 upstream of the Maipo Bridge", indicating that this project is within the area declared by the DOH to be off limits for aggregates extraction. This Communication adds that "to date, no variations have been observed in the surroundings of the bridges, regarding potential risks - conversely, a more serious situation of overextraction is observed". Finally, it is indicated that the declaration of nullity for all projects approved by the Ministry of Public Works in the districts of Buin and San Bernardo remained in force at that time.

- Communication 536, dated May 23, 2008, whereby the DOH informs the General Manager of Áridos Guerrico, Mr. Adam Vidal, that the aggregates extraction project has not been approved, as "the removal of significant volumes of sediments upstream of the intakes of the Lo Herrera, Unidos de Buin, and Puente Los Morros channels will, under prevailing conditions, lead to wide-ranging undermining of riverbed constructions from clean water during times of high river levels, also leading to an enhanced likelihood of the undermining of bridge pilings (...). In the absence of specific works to control these effects, further erosion of the river bed may severely compromise not only the entry of water into intakes, but also the stability of bridge foundations - both of which risks are currently present and clearly visible".

This background information renders it clear that under this new scenario, with a 22% reduction in the river's aggregates transport capacity, the currently critical situation of the water intakes and bridges constructed on the riverbed will be further aggravated.

An EIS is defined as a document that provides point by point details of the characteristics of a project or activity that is planned for implementation. It should provide documented background information that can be used to predict, identify, and interpret its environmental impact and describe the action or actions that it shall take in order to prevent or minimize all significant adverse effects. EIS studies are approved if they comply with legislation in force and address the effects, characteristics, or circumstances in question, and propose mitigation and restoration measures that are appropriate and proportionate in the context of the impacts identified.

In this particular case, taking into account the situation described above, the EIS submitted by AES Gener does not meet the objectives that were the intention set forth in the drafting of legislation requiring Environmental Impact Studies, for the following reasons:

- With regard to sedimentation dynamics, no complete baseline was presented addressing the real situation of the riverbed with and without the project. The risk aspects mentioned above are not taken into account, and no mention is made of the DOH mandate currently in force prohibiting aggregates extraction 4 km upstream and 4 km downstream of the Puente Maipo bridge. All in all, the Project Owner fails to address the riverbed situation, which is a well-known matter of public knowledge.
- Although it is recognized that the river's aggregates production capacity will decline by 22%, the Project owner does not mention or evaluate its expected impact on the river's sedimentation dynamics, paying particular attention to the delicate situation of the riverbed. Here, it should also be born in mind that the reduction of sediment input into the Maipo River from its tributaries, and the sudden increase in water without sediment load downstream of the confluence of the Colorado and Maipo River will aggravate the sedimentation imbalance that is a growing concern, as recognized by sector authorities, thus aggravating riverbed erosion. None of these effects are addressed in the study issued by AES Gener.
- Water extraction in the Volcán and Yeso rivers will lead to a drop in sediment transport capacity, thus reducing sediment input downstream
- In particular, no efforts are made to address the sudden increase in the river's sediment transport capacity through the incorporation of a major flow of water without sediment load, discharged after passing through the turbines and returned to the river system. This effect will aggravate the degradation process mentioned above, as it will act at a point along there river where its effects on the situation will be entirely negative - this time in parts of San José de Maipo adjacent to the districts of Puente Alto and Pirque.
- Therefore, the EIS fails to describe the actions that shall be taken in order to prevent or minimize significantly negative effects on irrigation infrastructure and the bridges constructed with pilings in the river.
- Nonetheless, it is interesting to note that the EIS itself admits, in Annex 20, that if the predicted reductions in sediment availability downstream of the Independent Intake implemented by the project come to pass, then although these variations are relatively minor, they may lead to local problems if measures are not taken to ensure more rational management of the watercourse and available water and aggregates resources. This management should clearly be conducted for the river basin as a whole, by the competent authority". In other words, although the Project Owner classifies the decline in the availability of aggregates as "relatively light", it admits that the project may lead to local problems - this is not sufficient. Furthermore, it transfers the responsibility for enacting suitable measures to the competent authority. Although it is true that the management of the issue must be conducted at a global level for the river basin as a whole, it is equally true that if the PHAM is to aggravate the situation facing the river's bridges and water intakes, particularly around San Bernardo and Buin, the impact evaluation and mitigation and reparation measures should be proposed and implemented by the Project Owner - which in this case has not occurred.
- The environmental management measures proposed by the Project Owner include the implementation of global studies, working alongside the authorities, to plan the integrated management of the river's resources. This is clearly insufficient, as such studies will not compensate or mitigate the real impacts to be caused by the implementation of the project affecting the water intake works of the aforementioned irrigation channels.

It is therefore necessary for the Project Owner to conduct a real estimation of the magnitude

of riverbed degradation, and to issue a concrete prediction of the effects that would arise if the current scenario (which is recognized by sector authorities) were subject to the additional stresses of the project, and how significant adverse effects impacting third parties are to be compensated or mitigated. The Project Owner should also provide guarantees for the base condition of existing infrastructure, particularly the intakes of the Arriagada Channel, Unidos de Buin Channel, Huidobro Channel, and Maipo Channels Association, as well as the bridges that cross the Maipo River on the Maipo Highway, the old highway bridge, and the railway bridge.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.06 Sediment**

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study** presented in **Annex 20 of the EIS**).

approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of river flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (**AGU.06.01**), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted.

It can be concluded that the Maipo River system can be managed such that, with the project operations, present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them.

Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

AGU.06.03 Maipo River Sand Production

With regard to the extraction of aggregates in the Maipo River, during the operations phase of the PHAM, the Project will not modify current natural sediment (aggregates) transport dynamics occurring in the river.

In effect, under the natural dynamics, sediment transport takes place mainly in the months of November, December, and January, as a result of snow and ice melt in the high mountains, and it is during this season that variations in

flow rate in the Maipo River caused by the project stand at their lowest levels. The same behavior applies to winter season rises in river level.

It must be pointed out that the PHAM returns water to the Maipo River in the Las Lajas area, located upstream of the El Canelo zone, and therefore downstream of this point the river's flow dynamics with the project shall be identical to those currently observed.

It is of great importance to observe that currently, without the PHAM in operation, slightly downstream of the Las Vertientes area (in the La Obra stretch of the river), during certain times of the year flow rate in the Maipo River watercourse drops significantly, leaving the river bed dry, due to water abstraction at the following intakes: La Sirena Channel, San Carlos Channel, Independent Intake owned by Aguas Andinas, etc.

Average water abstraction flow rates attributable to the main drinking water and irrigation intakes, many of which also make use of hydroelectric power as a byproduct, but discounting the effects of existing hydroelectric plants on these channels that discharge directly into the intakes, amounts to 113 m³/second, which is equal to the average annual flow rate in the Maipo River at Las Vertientes. Depending on water availability, the annual abstraction rate at these intakes varies between 78 and 164 m³/second.

This situation clearly explains the high level of perturbation observed in the

behavior of the Maipo River watercourse downstream of Las Vertientes, where the riverbed is dry except during periods of increased water level and in unusually wet years.

It is for this reason that the Project Owner asserts that its activities will have no impact on the current situation in the sand extraction sites located on the Maipo River.

AGU.06.04 Discharge effects

Water capture in advance of in-situ gravel removal leads first to a reduction in sediment load in water carried through the headworks to the turbine rooms, while the solid materials that is retained is returned to the river. At the point where water is discharged from the plants (Las Lajas area), water that has passed through the turbines - which contains a certain quantity of sediment - once again mixes with the water in the rivers, returning to its original conditions in terms of average sediment load (**Addendum, Section I, Question 28**).

At the point where water is returned to the Maipo River, in the Las Lajas area, there will be no degradation of the riverbed as it is composed entirely of rocks. It should be mentioned that the flow rate discharged from the PHAM at this point is always lower than the flow rate in the Maipo River just upstream.

During the operations phase of the Project, planned maintenance activities do not include any cleaning of tunnels and culverts. Inside the tunnels, the cross sectional area for water flow is small enough to prevent sedimentation. This is shown through the operation of the Alfalfal Plant for 20 years without any cleaning of the tunnels being included among maintenance activities.

The only operations that lead to the discharge of sediment are the discharge of gravel traps at the inlets, and the flushing of the sandtraps, returning sediment to the river once a certain volume has built up within them. These operations are conducted intermittently and for short time periods (1 minute for sandtraps, 10 minutes for gravel traps), at variable frequency depending on the season. For more information see the **Addendum, Section IV, Question 3**.

SLD Health Impact

The Project owner shall take responsibility for ensuring compliance with health and safety regulations, in order to prevent any possible risk to health and physical integrity for the inhabitants of San José Maipo as well as the persons working on the Project.

SLD.02 Atmospheric

Although the Project involves surface construction activities, which will lead to the emission of particulate matter, plans call for the implementation of a suite of mitigation measures that will result in a considerable reduction in emission, not only of the PHAM itself but also as against the baseline of current particulate emissions throughout the Project's area of influence. In addition to the above, these considerations should be evaluated bearing in mind the fact that most of the Project's works will be underground, not producing any emissions of particulate matter.

Conversely, given that most of the Project's works are to be located in high mountain areas, it can be stated that the prevailing ventilation conditions in this environment will facilitate the dispersion of dust, with a natural reduction in emissions during the winter season as a result of the additional moisture contributed by rain and snow precipitation.

For more information on emissions compensation measures, see **Annex 5 of the EIS**.

SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

SUE.01 Regulations

The Project Owner is subject to the following regulations, which are specified in detail in Chapter 5 of the EIS, Section 5.7.2.1, regarding the Santiago Metropolitan Master Plan.

With regard to planning instruments, the PHAM is to be implemented in the district of San José de Maipo, which does not have a District Master Plan (one is currently being prepared), and which only has current urban limits for the settlements of San Alfonso, La Obra, San José de Maipo, El Melocotón, San Gabriel, and Las Vertientes. Conversely, the Santiago Metropolitan Master Plan (PRMS) establishes a number of land use regulations that apply to the project area, most of which are related to ecological preservation and/or protection and risks. Most of the district's surface area is classed as Ecological Preservation Area, which aims to maintain a zone's natural state, in order to preserve and contribute to the environment's quality and equilibrium, as well as to preserve landscape heritage (see further information in the conclusions stemming from analysis of regulations, in Section 5.7.3, Chapter 5 of the EIS).

Supreme Decree 366 (Exploitation of Tamarugo, Carob, Chañar, Guayacán, Aextoxicon, Charcoal, Acacia, Boldo, Maiten, Litre, Bollen, and Quillay). This legal instrument governs the felling of

trees and bushes.

Supreme Decree 4363 and D.L 701 (Approving the Definitive Text of the Law on Woodland and Regulations on Forest Promotion).

Article 2 of the Woodland Law establishes an obligation that land classified as for preferential woodland land use, as well as natural and artificial woodlands, are subject to woodland management plans approved by the National Forestry Commission (CONAF). Furthermore, Article 21 of Decree Law 701 establishes that any felling or usage of native woodland shall be subject to the CONAF's prior approval of the corresponding management plan.

Decree 82 (Prohibiting the Felling of Trees and Bushes in Indicated Andean High Mountain and Foothill Areas)

Article 102 Sector Environmental Permit (Permit for the felling or exploitation of native woodland, in any type of land, or plantations located in land with preferential characteristics for woodland use).

For further information and analysis on the aforementioned regulations and permits, as applicable to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see Sections 3.2.6 and 3.3.7 in Chapter 3 of the EIS.

Remark N° 383

II. EFFECTS RESULTING FROM THE STOPPAGE OF ONE OR BOTH HYDROELECTRIC POWER PLANTS

The EIS submitted by AES Gener states that during the operation of the power plants, situations may arise that necessitate the stoppage of one or both plants for a certain period of time.

The stoppage of either of the two hydroelectric power plants, which could arise for a number of reasons such as load rejection or deliberate shut-down for maintenance, would stop the movement of the water column through the project's conduits - leading to overspill from the water intakes located in the headwaters of the Volcán and Yeso rivers.

The consequent cessation of water discharge into the Maipo River through the tailrace tunnel would result in a change of location of this flow rate. In the case of the El Alfalfal II Plant, flow would be displaced from the headwaters of the Yeso and Volcán rivers to the Aguas Andinas and irrigation channel intakes over a period of at least 10 hours, although the EIS indicates the figure of 5 hours.

Regardless of the number of hours before the return of flow rate to the river, during this period water would not be available for users downstream of the discharge point, clearly affecting their water usage rights. Indeed, most water abstraction downstream of the Las Vertientes area is conducted by members of this Neighborhood Watch Group, who hold continuous water usage rights. Continuous water usage means that the owner of these rights is empowered to use water without interruptions, 24 hours per day (3). Any circumstance affecting this availability would imply damage to the rights held, as the users would be prevented from making use of one of the basic aspects of their ownership rights - the right to abstract and make use of water at any time, at their own convenience. These rights may be limited only by law, so long as the water usage right in question has the protection of the same legal and constitutional guarantees that protect the right to property. The same situation would apply to the holders of in-stream water usage rights located downstream of the Las Lajas Plant, most of whom also hold continuous usage rights.

Given that the EIS presented by AES Gener recognizes that one effect of the implementation of the PHAM would be the possibility of stoppages of one or both of the hydroelectric plants, it should include corresponding solutions that compensate or mitigate the effects on holders of water rights downstream of the discharge point, who would suffer limitations affecting on the essential attributes of their rights.

Finally, it should be born in mind that the Neighborhood Watch Group is the body legally tasked with the distribution of water in the natural watercourse that it administers. This distribution must be conducted in accordance with the law, which means that it must be conducted in accordance with the rights held by its members, taking into account all measures necessary to foster the complete exercise of these rights and the correct distribution of water rights under its control. Therefore, this groups considers it vital that AES Gener implement measures to compensate or mitigate the effects of stoppages at one or both plants, making a binding agreement in favor of those affected, such as to guarantee the rights held by third parties - rights that this group is under an obligation to protect.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in **Chapter 2 of the EIS**.

AGU.02.01

Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near

the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 "Hanging" **channels**

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 **Maximum flow rates to be abstracted**

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 **Ecological flow rates**

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 384

III. FILLING OF TUNNELS

The description provided of the tunnels that will channel water to the two hydroelectric power plants, it is indicated that they will have a length of approximately 70 kilometers and an average cross section of approximately 22.4 m². Thus, before the two plants can become operational, and thus equally before water can begin to be returned to the river, these tunnels must be filled with a volume of water (equivalent to at least 850,000 m³) which will not be returned to the river. This is shown in the table provided below:

Tunnel	Length	Cross section	Partial Volume
El Volcán	14,000	12.5	175,000
Alfalfal II	15,000	16.0	240,000
Las Lajas	9,600	25.5	244,800
Alfalfal II tailrace	3,400	21.0	35,700
Las Lajas tailrace	13,400	33.0	
Alfalfal II headworks	2,400	38.0	91,200
Las Lajas headworks	1,900	38.0	72,200
Total	59,700		858,900

The same situation applies to the filling of the Las Lajas Plant forebay, with 300,000 m³ of water. Given that the Project owner holds in-stream water rights and not end user rights, water captured at the intake must be returned to the river. If the water is not returned, the Project Owner must acquire or lease the corresponding end user water rights for the filling of the tunnels, every time that they are emptied for any reason.

As indicated above, this Neighborhood Watch Group is the body legally tasked with distributing water from the Maipo River - as such, it cannot permit the modification of the river's current distribution regime without the approval of the owners of end user water rights constituted downstream, in order to authorize the use of their rights to fill the tunnels.

Meanwhile, Annex 17 of the EIS states that "the only modification of the Maipo River's natural flow dynamics at the Las Lajas discharge point will occur the first time that the Las Lajas forebay is filled, requiring 300,000 m³. For this purpose, and in the event that this activity causes any disadvantage for downstream water rights, the Project Owner will consider leasing or acquiring the corresponding temporary end user water rights"

As explained above, and above and beyond the total volume required to fill the tunnels, the impact on water rights is no "an eventuality" but rather a definite fact, so long as these end user rights are owned by other users.

To date, this Group has not been informed by any of the persons potentially affected of any approach by the Project Owner with a proposal that they assign rights to fill the tunnels. Therefore, this Group considers it vital that this highly significant adverse effect be taken into account by the Project Owner, in order to propose the corresponding compensation measures and provide necessary binding agreements. Once such agreements have been reached, they should be reported to this Group such that it may take such measures as may be necessary to alter the normal river water distribution regime.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in **Chapter 2 of the EIS**.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**).

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order

to maintain ecosystems. The operation and construction of the power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 385

IV. SURGE TANK AND FOREBAY

As indicated in the PHAM EIS, the Las Lajas hydroelectric power plant will incorporate an artificial reservoir for use as a forebay, with a volume of approximately 300,000 m³. This forebay will permit modification of flow rates when the river level is low, remaining within the limits of operating requirements in terms of energy generation by the company that owns and operates the Las Lajas plant. This will provide a measure of control over the natural flow regime in the Colorado River, with knock-on effects on the quality and continuity of water flow in the Maipo River, affecting the rights of water users located downstream in the first stretch of the river. It is therefore deemed necessary for the project pertaining to this plant to include a compensation tank or an alternative solution so as not to affect the rights of third parties. Effectively, the in-stream water rights used by AES GENER S.A. for this project oblige it to abstract water and then return it immediately, as stipulated in Article 14 of the Water Code.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

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Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

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AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

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AGU.02 Third party water

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AGU.02.01
Irrigation

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With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 **"Hanging"** **channels**

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

Remark N° 386

V. STREAM GAUGES - ARTICLE 38 OF THE WATER CODE

As indicated in the Preliminary Question in this remark submission, the area's Neighborhood Watch Groups objective is to administer and distribute water in natural watercourses over which their members hold usage rights, and to oversee water abstraction, ensuring that it is conducted using suitable installations and in conformity with all usage rights held. In this regard, it should be pointed out that under Chilean institutional division of responsibilities, the only institution called upon to conduct this task are the Neighborhood Watch Groups, and distribution cannot be delegated to the holders of the water rights.

Meanwhile, Article 38 of the Water Code states that the sole owner of an aqueduct that abstracts water from a natural watercourse is obligated to construct, as a minimum and at its own expense, an intake with sluice gates and a tailrace and channel to return water or excess water to the watercourse of origin, as well as all devices necessary to control and measure flow rates in water extracted.

Therefore, as clearly stipulated in Chilean water legislation, each water user must install and operated necessary flow rate measurement systems in order to comply with Neighborhood Watch Group requirements. These systems are the responsibility of the interested party, and should be agreed upon with the Watch Group in question, such as to provide a guarantee to the community of correct water distribution.

In this particular case, this Group will require stream gauges or flow measurement systems, connected by telemetry to the offices of the Watch Group, at each of the intakes mentioned in the PHAM EIS, and at points of water discharge into watercourses - operating the same measurement and control system currently used in the first stretch of the Maipo River subject to the jurisdiction of this group.

VI. DOCUMENTS The following documents are attached as exhibits pertaining to this submission: Santiago, April 21, 2008. To: Asociación de Canales Unidos de Buin
Ord: 1.059-99-659

Ref: Impacts on ACUB from mass exploitation of aggregates in the Maipo River. Dear Sirs:

With regard to the information request relating to the effects of the mass exploitation of aggregates in the Los Morros area, the following observations are presented.

Over the 14 years that the undersigned has been providing technical advisory services for the Asociación de Canales Unidos de Buin (ACUB), aggregates extraction conducted by a number of companies in the field has exerted a growing impact on the 4 km stretch of river where the ACUB's intake works and channel running along the river's south bank are located. During this period, it has been observed that the main channel of the river in its natural watercourse downstream of the Los Morros Bridge has eroded downwards by over 6 meters, leading to severe negative impacts on the infrastructure owned and operated by the ACUB - in particular, the main channel intake work and river defense breakwaters of this major irrigation infrastructure, which serves some 14 thousand hectares in the districts of Buin and Paine, and has done so for over 100 years.

The principle costs that have arisen to date as a result of this degradation of the riverbed relate to the construction of works to provide new foundations for the intake structure, and the installation of other flood defenses. These costs have been paid in full by this organization, with no contribution by the aggregates companies that cause the problems, and that gain major economic benefits from their business activities.

In concrete terms, the principal works that the ACUB has been forced to construct during this period are:

i. Deepening of intake works foundations on two occasions - in 1999 and 2006 - with a total vertical depth increase of 6 meters. For this reason, the association built and installed over 200 steel cages located around this installation, each weighing 20 tons and filled with carefully selected river rocks, linked together, and clad in concrete. Further excavations were necessary on two occasions, with the need to remove over 5000 m³ to prevent further problems. In 2007 it was also necessary to deepen the foundations of a breakwater located upstream of the Los Morros bridge, providing flood protection for the channel intake, which had suffered undermining of the riverbed, as had previously occurred further upstream.

ii. ACUB has built two new major breakwaters (N 7 and N 9) and has reinforced a further three very large breakwaters, using the same large reinforced gabion cages to protect the edges of the channel, which have been negatively affected by riverbed erosion - which now, during high water levels, can easily destroy the association's old breakwaters, which were constructed with deep foundations but which have now been completely undermined. In other words, during periods of high river levels, the force of the current can easily wash away the grounds on which the defensive breakwaters are built and thus destroy them, with clear negative effects on the association's principal channel. This channel is built up to 7 meters above the previous level of the riverbed, and is therefore up to 13 meters above the level of the eroded riverbed. It is therefore clear that a serious increase in river level could result in major damage to this channel.

iii. It is estimated that the costs of these works over the past 14 years have led to an outlay by the association of well over CLP 500 million, directly attributable to the severe drop in the level of the riverbed caused by massive aggregates extraction, with the removal of several million m³.

iv. ACUB has recently held meetings with new aggregates companies that are planning to conduct massive extraction projects upstream of the Los Morros Bridge - a cause for major concern on the part of the association, as damages and costs for the channel's partner owners will be increased and yet the companies responsible will not be held liable.

The association possesses an extensive photographic record illustrating these problems, particularly the constructions undertaken to provide a minimal level of protection for the main channel - which is the source of irrigation of the entire area covered. The results of topographic surveys of the riverbed are also available, having been created to analyze the problem and to protect the association's interests against the interests of the aggregates companies.

- (2) Article 266 of the Water Code.
- Article 274 of the Water Code. (3)
- Article 19 of the Water Code.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4 in Chapter 2 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

AGU.04.04 Monitoring and control of flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

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Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates

throughout the useful life of the project.
For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	Stream gauge station		
	406,157	6,259,100	
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study** presented in **Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence. Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation**

equilibrium” (AGU.06.01), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity. Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project’s area of influence.

Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted.

It can be concluded that the Maipo River system can be managed such that, with the project operations, present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them.

Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

AGU.06.03 Maipo River Sand Production

With regard to the extraction of aggregates in the Maipo River, during the operations phase of the PHAM, the Project will not modify current natural sediment (aggregates) transport dynamics occurring in the river.

In effect, under the natural dynamics, sediment transport takes place mainly in the months of November, December, and January, as a result of snow and ice melt in the high mountains, and it is during this season that variations in

flow rate in the Maipo River caused by the project stand at their lowest levels. The same behavior applies to winter season rises in river level.

It must be pointed out that the PHAM returns water to the Maipo River in the Las Lajas area, located upstream of the El Canelo zone, and therefore downstream of this point the river's flow dynamics with the project shall be identical to those currently observed.

It is of great importance to observe that currently, without the PHAM in operation, slightly downstream of the Las Vertientes area (in the La Obra stretch of the river), during certain times of the year flow rate in the Maipo River watercourse drops significantly, leaving the river bed dry, due to water abstraction at the following intakes: La Sirena Channel, San Carlos Channel, Independent Intake owned by Aguas Andinas, etc.

Average water abstraction flow rates attributable to the main drinking water and irrigation intakes, many of which also make use of hydroelectric power as a byproduct, but discounting the effects of existing hydroelectric plants on these channels that discharge directly into the intakes, amounts to 113 m³/second, which is equal to the average annual flow rate in the Maipo River at Las Vertientes. Depending on water availability, the annual abstraction rate at these intakes varies between 78 and 164 m³/second.

This situation clearly explains the high level of perturbation observed in the behavior of the Maipo River watercourse downstream of Las Vertientes, where the riverbed is dry except during periods of increased water level and in unusually wet years.

It is for this reason that the Project Owner asserts that its activities will have no impact on the current situation in the sand extraction sites located on the Maipo River.

AGU.06.04 Discharge effects

Water capture in advance of in-situ gravel removal leads first to a reduction in sediment load in water carried through the headworks to the turbine rooms, while the solid materials that is retained is returned to the river. At the point where water is discharged from the plants (Las Lajas area), water that has passed through the turbines - which contains a certain quantity of sediment - once again mixes with the water in the rivers, returning to its original conditions in terms of average sediment load (**Addendum, Section I, Question 28**).

At the point where water is returned to the Maipo River, in the Las Lajas area, there will be no degradation of the riverbed as it is composed entirely of rocks. It should be mentioned that the flow rate discharged from the PHAM at this point is always lower than the flow rate in the Maipo River just upstream.

During the operations phase of the Project, planned maintenance activities do not include any cleaning of tunnels and culverts. Inside the tunnels, the cross sectional area for water flow is small enough to prevent sedimentation. This is shown through the operation of the Alfalfa Plant for 20 years without any cleaning of the tunnels being included among maintenance activities.

The only operations that lead to the discharge of sediment are the discharge of gravel traps at the inlets, and the flushing of the sandtraps, returning sediment to the river once a certain volume has built up within them. These operations are conducted intermittently and for short time periods (1 minute for sandtraps, 10 minutes for gravel traps), at variable frequency depending on the season. For more information see the **Addendum, Section IV, Question 3**.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated

in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly

frequented, minimizing their visual impact.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1)

Chapter 3 of the EIS provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

Remark N° 387

1 ENVIRONMENTAL COMPONENT: WATER Hydrological Aspects

1. At present, a number of motions have been filed opposing each of the water transfer requests, by third parties who believe they will be affected. Therefore, the transfer of rights is by no means guaranteed, as it falls within the remit of the courts to decide on these cases, in accordance with the stipulations of the Water Code.

With regard to water usage rights already granted in this hydrological system, water shortages currently exist in areas that currently suffer “legal” water shortages, even if effects have yet to emerge as a result of some water rights going unused. This problem may be aggravated by the transfer of water rights requested in the headwaters of the Volcán and Yeso Rivers, with a water abstraction point near the settlements of El Melocotón. Any future transfer of rights upstream of this point will affect the hydrological balance of points that were previously not affected by such potential abstraction.

Furthermore, it should be pointed out that historically and traditionally, local residents have used water obtained from small channels to irrigate small market gardens and orchards, for example in the area of El Volcán and Los Maitenes. These persons do not hold legally validated water rights, despite having historically made use of water from the river. What will be the fate of these families? It is also indicated that most of these families have low incomes, and taking away their irrigation water would condemn them to lose the supply sources for their gardens, orchards, and small plots of land.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project’s base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project’s EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project’s area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights,

shall not affect the usufruct of water usage rights held by third parties (**see Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see **Table 2.3.4** in **Chapter 2 of the EIS**.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that is, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (**see the Addendum, Section I, Question 40**)

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human

activities.

SUE.02 Soils, meadows, and wetlands

The Project Owner has conducted a number of studies with the aim of characterizing the vegetation of summer grazing areas (La Engorda) (see details in Addendum 1, Annex 6, and in Chapter 5 of the EIS), as well as

flora and vegetation studies in the Project's area of influence (EIS, Chapter 5).

These studies contain information compiled in fieldwork campaigns conducted in Fall 2005, Spring 2006, November 2007, March 15 and 16, 2008, and September 2008, which add to the body of knowledge available regarding vegetation in these areas.

The Lo Encañado area shall be assigned a status of controlled access area for works contractors at all times: it shall not be subject to any intervention whatsoever. For more information on vegetation areas that could be affected by the construction works, and to learn about mitigation measures proposed by the Project Owner, you are advised to review Annex 42 of the EIS and Annex 6 of the Addendum.

With regard to environmental regulations that apply specifically to vegetation and plant life, the Project Owner shall be subject to:

Supreme Decree 366 (Exploitation of Tamarugo, Carob, Chañar, Guayacán, Aextoxicon, Charcoal, Acacia, Boldo, Maiten, Litre, Bollen, and Quillay). This legal instrument governs the felling of trees and bushes.

Supreme Decree 4363 and D.L 701 (Approving the Definitive Text of the Law on Woodland and Regulations on Forest Promotion).

Article 2 of the Woodland Law establishes an obligation that land classified as for preferential woodland land use, as well as natural and artificial woodlands, are subject to woodland management plans approved by the National Forestry Commission (CONAF). Furthermore, Article 21 of Decree Law 701 establishes that any felling or usage of native woodland shall be subject to the CONAF's prior approval of the corresponding management plan.

Decree 82 (Prohibiting the Felling of Trees and Bushes in Indicated Andean High Mountain and Foothill Areas)

Article 102 Sector Environmental Permit (Permit for the felling or exploitation of native woodland, in any type of land, or plantations located in land with preferential characteristics for woodland use).

For further information and analysis on the aforementioned regulations and permits, as applicable to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see Sections 3.2.6 and 3.3.7 in Chapter 3 of the EIS.

Remark N° 388

1 ENVIRONMENTAL COMPONENT:

WATER Hydrological Aspects

2. The Project Owner should present a complete study on the functioning of the forebay mentioned in the EIS, in view of the dangers inherent in accumulating 300,000 m³ of water in the upper river basin in the Aucayes area. In fact, Article 294 of the Water Code requires special procedures for documentation relating to the construction of new major infrastructure.

The average freeboard should be calculated using a method that takes into account not only safety parameters but also wave height, wind speed, and seasonal and local parameters.

Additionally, an operational simulation should be presented that includes possible emergency situations, and corresponding contingency plans.

The schematic presented does not include the spillway weir. This element of the system should be designed to handle a situation where the intake flow rate exceeds the output flow rate, indicating where water is discharged, and the environmental impact and risk that may arise as a result of this situation.

During project startup and any major maintenance stoppage, the PHAM will require an estimated 2,000,000 m³ of water to fill or refill intake works, tunnels, and headworks installations.

This volume is equivalent to the end user water rights granted to third parties, which would be affected.

Furthermore, during operations, maintenance events may arise whereby the PHAM shuts down for a set period of time. This situation will lead to a significant drop in flow rate in the Maipo River downstream of the Las Lajas discharge spillway, due to the delay while water would be flowing through its natural watercourses to the intakes of irrigation channels and other water abstraction installations owned by Aguas Andinas and by third parties.

Additionally, on plant restart after maintenance shutdowns, 2,000,000 m³ of water will be required to refill the system.

A complete analysis of proposed effects, uses, and mitigations measures is requested, in order to clarify this situation.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see **Table 2.3.4**

in Chapter 2 of the EIS.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that is, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations

made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 “Hanging” channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project’s area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of**

flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Q_e) approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

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Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Eastings	Northing
	Alto Volcán	Stream gauge station	6,259,100
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum.RSG Risk**

The Project Owner possesses a general risk prevention strategy that imposes certain measures on the Project during its different stages of advance. This strategy features the following components:

- a) Measures incorporated into the Project's engineering design.
- b) Systematic verification of compliance with applicable regulations
- c) Establishment of restricted areas
 - c.1) Area restricted due to their archeological, paleontological, or heritage value
 - c.2) Area of natural value that requires protection by the Project
 - c.3) Officially protected area.
- d) Expert supervision during construction
- e) Training regarding environmentally sensitive issues
- f) Internal risk management and accident prevention programs
- g) Separation of works installations and encampments

For further information on each of these points, please see **Chapter 7 of the EIS**, which specifies the **Environmental Management Plan**, the **Risk Control and Prevention Plan** designed for the Project, the safety measures to be adopted in light of the risks identified, and, finally, the **Accident control plan**, to be activated in the event of the failure of the preventive measures taken by the Project Owner. Furthermore, **Annex 32 of the EIS** presents the **Risk and Contingency Prevention Plan** for contractors.

RSG.01 Load rejection

During the operation of the power plants, situations may arise that necessitate the stoppage of one or both plants for a certain period of time. Two temporary phenomena occur at such times, the effects of which must be analyzed. These phenomena are mass oscillations within tunnels carrying water under pressure, and impact on the Maipo River system's flow dynamics.

A special situation arises in the operation of a hydroelectric plant when a sudden stoppage occurs affecting its power generation units or discharge spillways. Load rejection can arise as a result of automatic shutoffs caused by internal or external failures:

- Internal. These situations relate to technical problems within the power plant that require the stoppage of the turbines. This can arise due to a mechanical failure (valve or turbine failure) or an electrical fault in the mechanisms that operate the generator units, or in the high tension switchgear (switches or power line distributors).
- External. External events can lead to total system failure (black out), which is a less frequent situation. This can be caused by a break in the power transmission line that serves both power plants.

Fortunately, such events are infrequent; by way of illustration, see **EIS Annex 17, Table 3.1**, which shows a summary of load rejections that occurred at the Alfalfal Power Plant from 2004 to 2007.

For further information on the analyses taken into account for different potential cases of failures in the power generation units in the Alto Maipo plants, please see **Annex 17 of the EIS and Annex 16 of Addendum 1**.

Remark N° 389

1 ENVIRONMENTAL COMPONENT:

WATER Hydrological Aspects

3. During the PHAM's operations phase, transient phenomena may occur that give rise to a water hammer effect - for example, closure of valves or sluices, or even mechanical failures. In this area, water hammer effects may occur at intakes, leading to unexpected sudden water flow into watercourses. In fact, background information indicates that this has occurred in the area of the Queltehues Intake and in the Olivares River. This represents a potentially fatal danger to persons happening to be in or near to the watercourses in question, if they are not warned of the coming water flow. The same is true for livestock. How will the company ensure that this event does not occur, or what safety measures will be in place to cover such a possibility? We would like to remind the Project Owner that the Maipo River Valley currently receives more than 1,500,000 Chilean and foreign tourists each year, most of whom engage in leisure activities close to watercourses.

Thematic responses

AGU Water

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RSG Risk

The Project Owner possesses a general risk prevention strategy that imposes certain measures on the Project during its different stages of advance. This strategy features the following components:

- a) Measures incorporated into the Project's engineering design.
- b) Systematic verification of compliance with applicable regulations c) Establishment of restricted areas
 - c.1) Area restricted due to their archeological, paleontological, or heritage value
 - c.2) Area of natural value that requires protection by the Project
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- d) Expert supervision during construction
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- Internal. These situations relate to technical problems within the power plant that require the stoppage of the turbines. This can arise due to a mechanical failure (valve or turbine failure) or an electrical fault in the mechanisms that operate the generator units, or in the high tension switchgear (switches or power line distributors).
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For further information on the analyses taken into account for different potential cases of failures in the power generation units in the Alto Maipo plants, please see **Annex 17 of the EIS and Annex 16 of Addendum 1**.

Remark N° 390

1 ENVIRONMENTAL COMPONENT:

WATER Hydrological Aspects

4. The Maipo River Sedimentation Study, prepared in March 2008 by the Civil Engineering Department at the Universidad de Chile and presented by AES GENER in ANNEX

20, concludes that the Project can be expected to lead to an average decline in total solid erosion and entrainment of 22%. This figure includes streambed transport and solids in suspension.

The study also concludes: "In view of the absence of integrated management plans for aggregates extraction activities in the Maipo River, annual extraction rates appear to stand at the very limit of the what is sustainable for the watercourse, as deduced for background information reviewed. In this scenario, any perturbation to the system could lead to local riverbed erosion problems, as has occurred in the past due to overextraction during certain periods. Therefore, if the predicted reductions in sediment availability downstream of the Independent Intake implemented by the project come to pass, then although these variations are relatively minor, they may lead to local problems if measures are not taken to ensure more rational management of the watercourse and available water and aggregates resources. This management should clearly be conducted addressing the river basin as a whole, and implemented by the competent authority".

It should be made clear that the study presented refers to average values, but that monthly estimates are also necessary. How will the Project Owner offset this situation, when it is equivalent to aggregates extraction at a rate of 3,000,000 tons per year, which alone would require an EIS. Additionally, the Project Owner does not possess permits for aggregates extraction in this district. What effects are expected on the El Toyo Bridge and the Las Vertientes Bridge? How will the project affect existing valid aggregates extraction permits in the area?

Thematic responses

AGU Water

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rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b9, Section I of the Addendum.**

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.

-
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information

on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998). As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity. It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence. Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area. The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (**AGU.06.01**), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity. Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence. Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted. It can be concluded that the Maipo River system can be managed such that, with the project operations, present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them. Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

AGU.06.03 Maipo River Sand Production

With regard to the extraction of aggregates in the Maipo River, during the operations phase of the PHAM, the Project will not modify current natural sediment (aggregates) transport dynamics occurring in the river. In effect, under the natural dynamics, sediment transport takes place mainly in the months of November, December, and January, as a result of snow and ice melt in the high mountains, and it is during this season that variations in flow rate in the Maipo River caused by the project stand at their lowest levels. The same behavior applies to winter season rises in river level. It must be pointed out that the PHAM returns water to the Maipo River in the Las Lajas area, located upstream of the El Canelo zone, and therefore downstream of this point the river's flow dynamics with the project shall be identical to those currently observed. It is of great importance to observe that currently, without the PHAM in operation, slightly downstream of the Las Vertientes area (in the La Obra stretch of the river), during certain times of the year flow rate in the Maipo River watercourse drops significantly, leaving the river bed dry, due to water abstraction at the following intakes: La Sirena Channel, San Carlos Channel, Independent Intake owned by Aguas Andinas, etc. Average water abstraction flow rates attributable to the main drinking water and irrigation intakes, many of which also make use of hydroelectric power as a byproduct, but discounting the effects of existing hydroelectric plants on these channels that discharge directly into the intakes, amounts to 113 m³/second, which is equal to the average annual flow rate in the Maipo River at Las Vertientes. Depending on water availability, the annual abstraction rate at these intakes varies between 78 and 164 m³/second. This situation clearly explains the high level of perturbation observed in the behavior of the Maipo River watercourse downstream of Las Vertientes, where the riverbed is dry except during periods of increased water level and in unusually wet years. It is for this reason that the Project Owner asserts that its activities will have no impact on the current situation in the sand extraction sites located on the Maipo River.

AGU.06.04 Discharge effects

Water capture in advance of in-situ gravel removal leads first to a reduction in sediment load in water carried through the headworks to the turbine rooms, while the solid materials that is retained is returned to the river. At the point where water is discharged from the plants (Las Lajas area), water that has passed through the turbines - which contains a certain quantity of sediment - once again mixes with the water in the rivers, returning to its original conditions in terms of average sediment load (**Addendum, Section I, Question 28**). At the point where water is returned to the Maipo River, in the Las Lajas area, there will be no degradation of the riverbed as it is composed entirely of rocks. It should be mentioned that the flow rate discharged from the PHAM at this point is always lower than the flow rate in the Maipo River just upstream. During the operations phase of the Project, planned maintenance activities do not include any cleaning of tunnels and culverts. Inside the tunnels, the cross sectional area for water flow is small enough to prevent sedimentation. This is shown through the operation of the Alfalfal Plant for 20 years without any cleaning of the tunnels being included among maintenance activities. The only operations that lead to the discharge of sediment are the discharge

of gravel traps at the inlets, and the flushing of the sandtraps, returning sediment to the river once a certain volume has built up within them. These operations are conducted intermittently and for short time periods (1 minute for sandtraps, 10 minutes

for gravel traps), at variable frequency depending on the season. For more information see the **Addendum, Section IV, Question 3**.

Remark N° 391

1 ENVIRONMENTAL COMPONENT:

WATER Hydrological Aspects

5. Additionally, the EIS should incorporate a complete study on expected effects due to climate change, as it is a state policy to take the effects of this phenomenon into account in national planning. The Project Owner is reminded that the "Study on Climate Variability in Chile for the 21st Century", prepared by the geophysics department at the Universidad de Chile's Science Faculty, is classified as an official CONAMA document, and predicts an estimated temperature rise of 2 °C to 4 °C, and an increase in the altitude of the 0 °C isotherm by 300 to 500 m, as against the current climate.

The study determines that on a seasonal basis the temperature increase may exceed 5 °C in some high-altitude areas of the Andes, particularly in summer. In terms of precipitation, the study predicts a general decline in the area of Central Chile of the order of 40%, with possible declines of up to 50%. This scenario would lead to a major drop in flow rates in the upper Maipo River basin.

We wish to remind the Project Owner that during 2007 the Maipo River had an average flow rate of 126 m³/s, as against a historic average of 207 m³/s, resulting in a 39.1% drop (22 April, 2008, seminar on "The Social and Economic Impact of Drought", Faculty of Agronomy and Forestry Engineering, Pontificia Universidad Católica de Chile).

Construction activities and subsequent operation of the PHAM may affect underground aquifers.

The Project Owner is requested to comment on this issue. A number of deep wells exist in the district, and these should be mapped and reviewed in terms of potential impacts of the PHAM.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated

flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfafal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River

Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	406,157		
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 393

1 ENVIRONMENTAL COMPONENT:

WATER Hydrological Aspects

7. The Project Owner is requested to comment on how the decline in flow rates in a major stretch of the Maipo River Basin will affect the receptor water body's dilution capacity. In this regard, attention should be paid to the stretch exposed, due to the large number of nearby settlements, such as Baños Morales, El Volcán, San Gabriel, El Ingenio, San Alfonso; Melocotón, San José de Maipo, Guayacán, and El Manzano, which generate and discharge wastewater and which, conversely, use water from the Maipo River for domestic and recreational purposes, etc. In order to maintain the current sanitary quality of these watercourses, the operating dynamics of existing wastewater treatment plants should be reviewed. A geographical survey should be plotted, and an analysis of the stretch of the river in question and the expected effects.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.05 Drinking water supply

Construction works and/or activities involved in the project (roads, movement of materials, transport of different products, etc) shall have no effect or impact whatsoever on the quality or security/safety of water supply in the Maipo River system. During the construction phase, Project interventions affecting watercourses shall cause only temporary effects resulting from Earth moving during excavation and other construction activities. This intervention shall affect small areas over short time periods, as it shall last only during the period while these installations are under construction (see **Section 6.4.1.4 of the EIS and Section VII, Question 17, in the Addendum**).

During operations, the PHAM shall not affect the Laguna Negra-Lo Encañado and El Yeso Reservoir system, which is managed by the company Aguas Andinas S.A, in its capacity as holder of the drinking water concession for Santiago; nor shall the Project affect the operational dynamics of the drinking water supply system. Therefore, the implementation of the PHAM does not imply any impact whatsoever on the supply of drinking water (see **Section I, responses 27 and 29, in the Addendum**).

Furthermore, the water abstracted by the Project shall be returned to the river 5 km upstream of the Toma Independiente or Independent Intake, operated by the company Aguas Andinas S.A., which abstracts water for drinking water supply to the city of Santiago; therefore, the PHAM shall not affect normal operations of this system. The PHAM shall only affect the delivery point of water in the tributaries of the Maipo River; in other words, water that currently does not drain into the Maipo River shall not be incorporated into that river's total flow.

However, in the event that an incident may arise as a result of an accident during construction, such as accidental spillages or rockfalls, the procedures described in the Contingency Plan shall be implemented, consisting of a suite of actions to solve associated problems. This plan is explained in detail in **Chapter 7 of the EIS, Section 7.2.5.**

AGU.05.01 **Drinking water
quality**

The process of hydroelectric power generation does not affect the physical/chemical qualities of water. Additionally, the PHAM does not plan to implement regulation installations that retain sediment. Thirdly, downstream of the discharge point the natural river conditions are maintained with regard to flow rate and physical/chemical properties.

During the construction of installations to be located in watercourses, the free-flowing course of the river is maintained through the construction of diversions through pipes laid along the river course for such purposes, or through channels that divert all flow, allowing free water circulation with no effect whatsoever on quality (see **Section I, Question 28, in the Addendum**).

The Project owner shall not make use of the Lo Encañado Lake or water usage rights owned by Aguas Andinas S.A. for this Project, instead opting to forgo usage of these resources and to replace the role that would have been fulfilled by the Lo Encañado Lake with a forebay located on a widening of the Alfafal II plant headworks, located in the Alto Aucayes area on the Colorado River Valley (for details, see **EIS 2.2.1**). The Lo Encañado area shall be assigned a status of controlled access area at all times: it shall not be subject to any intervention whatsoever.

The Project Owner has made available a Water Quality Monitoring Program, with specifications for application during both the construction and operations phases. This program espouses a commitment to verify the effectiveness of environmental control measures designed to minimize the effects of works construction activities during the construction phase.

For further information on the Monitoring Program, see **Sections 8.2 and 8.3** in **Chapter 8 of the EIS**.

Remark N° 394

1 ENVIRONMENTAL COMPONENT:

WATER Hydrological Aspects

8. A number of creeks and streams exist along the entire set of lines to be taken by project water conduits, over the surface and running through tunnels. Depending on the depth of works for tunnel boring, it is impossible to rule out that the bedrock may crack, leading to seepages of water away from the surface and reducing water flow in these watercourses, or leaving them dry. It should be born in mind that, in the conduit tranches running from the intakes in the Upper Volcán River Basin to the new forebay in the upper reaches of the Aucayes Stream, and from the Las Lajas turbine house to the point of discharge into the Maipo River, the tunnels function as an aqueduct - that is, they will carry water that is not under pressure, and therefore may absorb surface water and groundwater along their entire length. The Project Owner is requested to identify each of the creeks and streams that may be affected, indicating the depth of the crossing, the rock type, and the working pressure in the tunnel.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03.03 Underground water

Underground water will not be affected in any way by the operation of the Project. This is the case because the underground water flow capacity in each sector of the aquifer associated with the Maipo River is much lower than the minimum flow running through each section of the river, and therefore under all circumstances the aquifers shall remain saturated. Thus, underground water sources present in the area shall also not be affected.

The PHAM plans to construct 70 km of tunnels, of which approximately 50 km correspond to headworks or hydraulic pressure tunnels, the remainder being access tunnels for use during construction of the project and for subsequent operation of the power plants (see **EIS Chapter 5, Section 5.3.5.3**).

Most of these tunnels have been designed to operate at variable internal pressures, with a maximum achieved at certain points of a little more than 450 m. The design requirement for these tunnels is that the lower limit of principal compression in the surrounding rock medium is always less than the operating pressure, such as to maintain a sufficient safety margin to prevent alterations in natural permeability dynamics through hidrojacking. In areas where this design principle is not guaranteed, the Project plans to install impermeable tunnel linings (**EIS, Annex 45.4**).

During the excavation of these tunnels, it is possible that the work front may have to pass through permeable rock strata - leading to seepages of water into the tunnel, the magnitude of which will depend on the permeability of the rock, the depth of the tunnel, and the level of the water table. In some areas, tunnel wall treatments may have to be applied in order to prevent water transfer into or out of the headworks tunnels.

The Project does not plan to make use of any water seepages that may arise, in the generation of electricity. Additionally, the overarching design principles underpinning the Project are oriented towards limiting seepages during construction, in order to establish suitable conditions for efficient tunnel excavation activities. The same principle applies to methods to limit the infiltration of water from the tunnels into the rock mass, thus avoiding water loss during operations.

Additionally, these procedures guarantee that any groundwater that may intercept the tunnels shall suffer no change in its natural hydrological dynamics, or impact on any foreign components or water other than the water entering the system (**EIS, Annex 45**). Special attention will be paid to the quality and characteristics of any water that may eventually return to the natural water system through the tunnel access windows, and therefore construction contracts will specify measurements that must be made and the treatment that shall be required for subsequent disposal of such water, in order to ensure compliance with the quality requirements for water discharge into natural watercourses, under regulations currently in force.

In the event of seepages of water at high temperature and possible acidic composition, it is important to make clear that in general there shall be no major differences in the methods used to render the tunnel walls impermeable. During all site surveys conducted, research boreholes and surface geological maps produced to date applying to the areas through which the tunnels will pass, no evidence whatsoever has been found to lead to any prediction of the presence of

water

at high temperatures, or with mineral or acidic contamination. As additional background information, during the construction of the Alfalfal Plant - with the excavation of 35 km of tunnels - no events similar to those indicated above occurred. Notwithstanding the above, the specification establish that, in locations located close to potentially critical areas, the contractor must drill survey boreholes of between 25 m and 30 m in length ahead of the tunnel work front, in order to gain early warning of seepage problems and thus be able to apply impermeable tunnel wall treatments as required. See **EIS, Annex 45.4.**

AGU.04.05 Drought from infiltration of minimum ecological water flow

The Project's potential indirect impact on groundwater in the area of influence has been evaluated in detail in the report attached as **Annex 25 of the EIS**. According to this analysis, all aquifers located throughout the areas of influence will not be affected in any way. This is the case because the underground water flow capacity in each sector of the aquifer associated with the Maipo River is much lower than the minimum flow running through each section of the river, and therefore under all circumstances the aquifers shall remain saturated. Thus, underground water sources present in the area shall also not be affected.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

PRO.03.02 Tunnels

The majority of the Project is planned for installation underground. The general characteristics of the tunnels are described in Chapter 2 of the EIS, Table 2.2.5 (for detailed geological information on the path taken by the tunnels, see Annex 46 of the EIS).

For an evaluation of the impact and environmental management measures associated with underground installations, see Chapter 6 of the EIS.

Annex 45 of the EIS, Hydro-Geology of Underground Works, presents a general description of the geological conditions that are expected to be found along the lengths of the tunnels; expected permeability based on geological knowledge and hydro-geological conditions in the area, incorporating experience gained during the construction of tunnels for the Alfalfal Plant, which has been operative for more than 17 years; as well as a description that includes the design of the tunnels, providing a brief explanation of the methods to be used to reduce and control water seepage.

With regard to the impact of the path taken by the tunnel passing underneath the El Morado Natural Monument, and measures to be taken to respect the area, see Section I, Responses 4, 5, and 6, in the Addendum.

Remark N° 395

1 ENVIRONMENTAL COMPONENT:

WATER Hydrological Aspects

9. The Project Owner states that it will allow a flow rate of 0.2 m³/s to bypass the intake on the Yeso River, which is insufficient in view of the ecological flow rate of 1 m³/s established by the DGA for the Yeso River (hydrological analysis). The Project Owner is reminded that by definition, ecological flow rates apply throughout all stretches of the watercourse concerned.

The Project Owner must guarantee a flow rate of at least 1 m³/s along the full length of the river. Furthermore, we consider that the ecological flow rate and environmental water demand studies should incorporate restriction criteria based on projected increases in demand set forth in the water balances issued by the DGA for the Metropolitan Region, and variables established in prospective studies on climate variability in view of the effects of global warming.

In particular, the Project Owner should incorporate the statistical projections for the moderate and severe scenarios in the "Climate Variability Study" prepared by the Geophysics Department at the Universidad de Chile for CONAMA, as part of the Second National Communication to the UNFCCC. It should also incorporate the information generation through the adaptation to climate change study for the agriculture sector conducted by specialists at INIA and the Faculty of Agricultural and Forestry Sciences at the Universidad de Chile, for the government. Historic statistical measurements do not constitute a sufficient baseline for flow rates in the river basin, as the company should also take into account parameters relating to temperature increases, evaporation, and declines in precipitation and snow reserves, as established in official documentation issued by state services in the sector.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS**.

This section presents information characterizing the basins and tributaries of the Volcán, Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex

13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with

the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

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Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	Stream gauge station		6,259,100
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 396

1 ENVIRONMENTAL COMPONENT:

WATER Hydrological Aspects

10. The Project Owner establishes that it will allow a flow rate of 0.3 m³/s to bypass the intake on the Colorado River, which is not compatible with the ecological flow rate of 3.12 m³/s established by the DGA for the Colorado River (hydrological analysis). The Project Owner is reminded that by definition, ecological flow rates apply throughout all stretches of the watercourse concerned.

The Project Owner must guarantee a flow rate of at least 3.12 m³/s along the full length of the river, plus environmental water demand and rights held by third parties. In this case, the Project Owner is also requested to take into account the remarks made regarding the Yeso River.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in **Chapter 2 of the EIS**.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the

Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

Remark N° 397

1 ENVIRONMENTAL COMPONENT:

WATER Hydrological Aspects

11. The Project Owner establishes that the ecological flow rate for the Aucayes Stream will be zero. This is not acceptable, even though the corresponding water rights were granted under the old law. As this is a new project, the consideration given should center on ecological flow rate plus environmental water demand.
- Furthermore, it should be pointed out that historically and traditionally, residents of Maitenes have used water obtained from small channels to irrigate small market gardens and orchards. These families do not hold legally validated water rights, despite having historically made use of water from the river.
- What will be the fate of these families? It is also indicated that most of these families have low incomes, and taking away their irrigation water would condemn them to lose the supply sources for their gardens, orchards, and small plots of land.
- The Project Owner should ensure that residents of Maitenes maintain their historic right to use water for irrigation.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in
**Chapter 2 of the
EIS.**

AGU.02.01

Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources.

During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make

use of at the intakes of the channels that they possess and use to abstract water,

over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

Remark N° 398**1 ENVIRONMENTAL COMPONENT:****WATER Hydrological Aspects**

12. The Project Owner should respect all existing intakes and their current water abstraction capacity, allowing a sufficient flow rate to bypass its own intakes for this requirement to be met. The Project Owner should also conduct a cartographic survey of the irrigation needs of the families that have traditionally made use of this resource to irrigate their small plots of land, orchards, and gardens, and water availability should be ensured regardless of whether they possess legally constituted water rights.

Thematic responses**AGU Water**

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water**rights**

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in
**Chapter 2 of the
EIS.**

AGU.02.01**Irrigation**

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

Remark N° 399

1 ENVIRONMENTAL COMPONENT:

WATER Hydrological Aspects

13. According to information provided by the El Manzano and Maurino channel user associations, AES Gener refuses to accept liability for the costs of modifying and subsequently maintaining intake works.

According to information received in writing by the El Manzano Channel Water Community: Project Owner correctly describes the intake installations of the El Manzano Channel, and also proposes works that must be implemented (steel water abstraction stabilization installations and parapets), as without these works it would not be possible to obtain water in an adequate manner. The point is not only to describe the works, but also that the costs of these works, engineering, and maintenance over time should be paid in full by the company that is causing the impact. As we previously informed you, the company AES Gener refuses to accept liability for the costs of maintaining, repairing, or rebuilding intake works, as will be necessary every time that they suffer total or partial destruction preventing the abstraction of water, even though the solution proposed by the Project Owner is simple, low-cost, and semi-permanent. What will happen when these steel protective installations are totally or partially destroyed? Will the company immediately conduct necessary repairs? If a landslide blocks the watercourse, who will remove it? To date we have not incurred such costs, and as the Project Owner correctly indicates in its report, our water diversion installation is a simple heap of material from the riverbed - in other words, it is so simple that even though it has to be repaired every year, in normal years it is not severely affected as it is not located in the main watercourse, but rather at the edge of the river. If the river flow rate declines then it will be necessary to build a larger installation, which will be damaged by floodwaters every year. A topographic survey is also necessary, in order to define the exact position of the works that must be built for adequate water abstraction. The following remarks are presented regarding the works to be built in accordance with the proposals of the Project Owner:

The proposal does not take into account the tolerance of the riverbed substrate, which is composed of material that was collected for the construction of the El Alfalfa road and material that gathered there as a result of the 1986 landslide, which led to a permanent increase in the depth of the riverbed. In the past year, this effect has had a magnitude of approximately 60 cm.

Effects on the nearby mountain are not taken into account. This land form presents a vertical cliff face approximately 50 m high on the north-west side, with a buildup of layers rising some 30 m upwards from the base of the river, as this area is prone to landslides. On the one hand, stones and small landslides periodically calve off from the hillside and partially block inflow of water into the intake, and every time that such a landslide has occurred the course of the river have been affected, giving rise to changes in the main stream flow course, diversions, and considerable increases in depth that lead to a need to recondition water intake systems. Larger scale situations also occur, such as the 1986 landslide, which completely destroyed our intake; a public tender for irrigation works led to its redesign by INDAP and reconstruction, financed by the State. The new intake was opened in 1991, and five months later, on May 3, 1993, a landslide destroyed 85% of it, dragging a dividing wall 60 m and a containing wall 40 m. The following year it was rebuilt as the expense of its owner, and on July 14, 1995, and landslip containing approximately 11 m³ of rock and 20 m³ of sediment blocked the entry of the intake. On November 26, 1997, a landslide of approximately 24 m in length and 60 cm in depth blocked water input into the intake. June 17, 1998, and landslip containing approximately 7 m³ of rock and 10 m³ of sediment blocked the entry of the intake. On March 24, 1999, a landslide of approximately 38 m in length and 2 m in width blocked water input into the intake. On July 7, 2003, a landslide of approximately 42 m in length and 14 m in width blocked water input into the intake. On July 22, 2005, a landslide of approximately 60 m in length and 15 m in width blocked water input into the intake. We wish to make it clear that the only external financing provided was in 1992. The El Manzano Channel Irrigation Water Community is a non-profit making organization financed solely from dues paid by all of us.

As shown in Figure 3 "Conceptual layout of intakes on the Colorado River" and Figure 4 Section A "Diagram of an intake with steel reinforcement", water entering the intake directly strikes the base of the mountainside, doubtless leading to landslides every time the river rises. The Project Owner does not plan to install any protection for the base of the mountainside along the stretch subject to modification in this intake design, which would cushion the force of the river against the hillside.

Similarly, the Project Owner does not take into account obstructions in the flow of the river, as may be caused by tree branches, fallen trees, tires, trash, and other refuse that is continually brought downstream by the river and which interferes with its normal flow dynamics. This will lead to a requirement for the periodic extraction of all such items, to keep the intake in operation.

In accordance with the above, the proposal to modify the El Manzano Channel intake does not comply with minimal conditions to guarantee the permanent abstraction of water under the end user water rights held.

- Similarly, no measures are mentioned for application is the ecological flow (which is already minimal) drops, and no compensation is planned if water capture becomes impossible at any point in time. We observe that the Maurino Channel intake lies upstream of our own intake.

Thematic responses

Specific response

The Project Owner reiterates its commitment to ensuring that necessary infrastructure exists in the river to permit water to enter the channels at all times, in accordance with the rights granted and the availability of the river throughout the life of the PHAM project.

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the

operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4 in Chapter 2 of the EIS**.

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1) **Chapter 3 of the EIS** provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

PRO.01.01 Compensation

The concept of compensation refers to the act of indemnifying damages or harm caused. Within the framework of the EIS, the Project Owner has issued a proposal to the competent authority regarding a suite of environmental management measures aiming to minimize, compensate, and restore the Project's impacts, making their implementation sustainable (Chapter 6 of the EIS).

In this regard, compensation is understood to be included in the spirit or end goal of the environmental management measures proposed by the Project Owner, following the evaluation of the direct and indirect effects of the PHAM on each of the environmental components stipulated in Supreme Decree 95, SEIA Regulations.

Remark N° 400

1 ENVIRONMENTAL COMPONENT:

WATER Hydrological Aspects

14. It is hereby expressly stated that, as El Manzano lacks a regular supply of drinking water, irrigation water is often used to replace water for domestic use, particularly in bathrooms. Some properties also own and operate small water treatment plants. As can be seen clearly, irrigation water is fundamental for the community of El Manzano. Private deep wells also exist, supplying drinking water to a number of properties. How will the Project Owner ensure that groundwater is not affected?

Furthermore, the EIS appears to contain no study relating to the PHAM's impact on the aquifer that provides drinking water for San Alfonso. The system of pumps owned and operated by the San Alfonso Rural Drinking Water Committee is seriously precarious, and any variation in the level of the water table would affect the system.

The Project Owner is requested to attach studies that prove that the aforementioned problems will not be impacted by the Project.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4 in Chapter 2 of the EIS**.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that is, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**).

AGU.03.03 Underground water

Underground water will not be affected in any way by the operation of the Project. This is the case because the underground water flow capacity in each sector of the aquifer associated with the Maipo River is much lower than the minimum flow running through each section of the river, and therefore under all circumstances the aquifers shall remain saturated. Thus, underground water sources present in the area shall also not be affected. The PHAM plans to construct 70 km of tunnels, of which approximately 50 km correspond to headworks or hydraulic pressure tunnels, the remainder being access tunnels for use during construction of the project and for subsequent operation of the power plants (see **EIS Chapter 5, Section 5.3.5.3**).

Most of these tunnels have been designed to operate at variable internal pressures, with a maximum achieved at certain points of a little more than 450 m. The design requirement for these tunnels is that the lower limit of principal compression in the surrounding rock medium is always less than the operating pressure, such as to maintain a sufficient safety margin to prevent alterations in natural permeability dynamics through hydrojacking. In areas where this design principle is not guaranteed, the Project plans to install impermeable tunnel linings (**EIS, Annex 45.4**).

During the excavation of these tunnels, it is possible that the work front may have to pass

through permeable rock strata - leading to seepages of water into the tunnel, the magnitude of which will depend

on the permeability of the rock, the depth of the tunnel, and the level of the water table. In some areas, tunnel wall treatments may have to be applied in order to prevent water transfer into or out of the headworks tunnels.

The Project does not plan to make use of any water seepages that may arise, in the generation of electricity. Additionally, the overarching design principles underpinning the Project are oriented towards limiting seepages during construction, in order to establish suitable conditions for efficient

tunnel excavation activities. The same principle applies to methods to limit the infiltration of water from the tunnels into the rock mass, thus avoiding water loss during operations.

Additionally, these procedures guarantee that any groundwater that may intercept the tunnels shall suffer no change in its natural hydrological dynamics, or impact on any foreign components or water other than the water entering the system (**EIS, Annex 45**). Special attention will be paid to the quality and characteristics of any water that may eventually return to the natural water system through the tunnel access windows, and therefore construction contracts will specify measurements that must be made and the treatment that shall be required for subsequent disposal of such water, in order to ensure compliance with the quality requirements for water discharge into natural watercourses, under regulations currently in force.

In the event of seepages of water at high temperature and possible acidic composition, it is important to make clear that in general there shall be no major differences in the methods used to render the tunnel walls impermeable. During all site surveys conducted, research boreholes and surface geological maps produced to date applying to the areas through which the tunnels will pass, no evidence whatsoever has been found to lead to any prediction of the presence of water at high temperatures, or with mineral or acidic contamination. As additional background information, during the construction of the Alfalfa Plant - with the excavation of 35 km of tunnels - no events similar to those indicated above occurred. Notwithstanding the above, the specification establish that, in locations located close to potentially critical areas, the contractor must drill survey boreholes of between 25 m and 30 m in length ahead of the tunnel work front, in order to gain early warning of seepage problems and thus be able to apply impermeable tunnel wall treatments as required. See **EIS, Annex 45.4**.

AGU.04.04 Monitoring and control of flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Q_e) approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility

(**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility

(**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	Rain gauge station		
	406,157		6,259,100
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section**

8.2.3).

For more information, see **Annex 17 of the Addendum.**

AGU.05 Drinking water supply

Construction works and/or activities involved in the project (roads, movement of materials,

transport of different products, etc) shall have no effect or impact whatsoever on the quality or security/safety of water supply in the Maipo River system. During the construction phase, Project interventions affecting watercourses shall cause only temporary effects resulting from Earth moving during excavation and other construction activities. This intervention shall affect small areas over short time periods, as it shall last only during the period while these installations are under construction (see **Section 6.4.1.4 of the EIS and Section VII, Question 17, in the Addendum**).

During operations, the PHAM shall not affect the Laguna Negra-Lo Encañado and El Yeso Reservoir system, which is managed by the company Aguas Andinas S.A, in its capacity as holder of the drinking water concession for Santiago; nor shall the Project affect the operational dynamics of the drinking water supply system. Therefore, the implementation of the PHAM does not imply any impact whatsoever on the supply of drinking water (see **Section I, responses 27 and 29, in the Addendum**).

Furthermore, the water abstracted by the Project shall be returned to the river 5 km upstream of the Toma Independiente or Independent Intake, operated by the company Aguas Andinas S.A., which abstracts water for drinking water supply to the city of Santiago; therefore, the PHAM shall not affect normal operations of this system. The PHAM shall only affect the delivery point of water in the tributaries of the Maipo River; in other words, water that currently does not drain into the Maipo River shall not be incorporated into that river's total flow.

However, in the event that an incident may arise as a result of an accident during construction, such as accidental spillages or rockfalls, the procedures described in the Contingency Plan shall be implemented, consisting of a suite of actions to solve associated problems. This plan is explained in detail in **Chapter 7 of the EIS, Section 7.2.5**.

Remark N° 401

1 ENVIRONMENTAL COMPONENT:

WATER Hydrological Aspects

15. The methodology presented by the Project Owner for the calculation of ecological flow rates was developed for river-type hydrological systems, where the base of the ecological energy pyramid consists of endemic phytoplankton. It therefore fails to take into account the input of organic material from outside of the system in the functioning of such river ecosystems.

It is requested that this situation be evaluated. Furthermore, it is a known fact that reductions in flow rates will lead to an increase in water temperatures. How will this affect water quality? Plant and animal life? Growth of algae and bacteria? The dilution capacity of the watercourses?

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS**.

This section presents information characterizing the basins and tributaries of the Volcán, Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex

13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS**.

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles,

70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3**, and

Addendum 1, Annex 17). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempe Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum.**

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neoporteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo Spinolosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Lilolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

Remark N° 402

1 ENVIRONMENTAL COMPONENT:

WATER Hydrological Aspects

16. The Project's Area of Influence covers more than half of the district of San José de Maipo, which is classified as a ZOIT area of national tourism interest. In view of the scale of the roads, trails, water conduits, encampments and site installations, waste disposal heaps, and traffic effects, as well as other construction impacts, the project will have a significant effect on the road network, landscape value, and flow rates in rivers and streams - the key attractions of the ZOIT.

However, the Project Owner has not presented adequate information or analysis regarding the status of the ZOIT, covering impacts affecting the area as a whole with and without the project; rather, it merely proffers a partial statement that a particular intake will have little impact, that reductions in flow rate will not be perceptible from the road, or that an area lacks tourism initiatives. This approach falls far short of responding to the concerns of the district (local companies and Chambers of Commerce and of Tourism)

regarding short term and medium term impacts on tourism development and activities in the area. Therefore, the Project Owner is requested to present a study (which should be conducted by a body that is independent of the company's interests) into the project's impacts, works, and use of water resources from the rivers of the San José de Maipo ZOIT.

This study should be conducted before the state services continue to analyze the project, and should be taken into consideration when COREMA is deciding on the project's Environmental Qualification.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plant (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as

the floating population of Project personnel

will remain at the encampments and work sites, all of which are located at a significant distance from populated areas. The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfa Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **TUR Tourism Scenery**

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.01 River sports

During the operations phase, the activities of the PHAM shall not directly or indirectly interfere with tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. Furthermore, the PHAM shall have no significant effect on boating activities on the Maipo River as a result of reductions in river flow rate; an analysis is presented in Annex 17 of the Addendum modeling a number of hydrological scenarios (1), concluding that the PHAM shall not affect the current situation in rafting and kayaking activities conducted in the area between San Gabriel and San José de Maipo.

In order to establish an analysis comparing the current Maipo River boating situation with predictions for the situation with the Project operational, the variables of flow rate, river width, and water depth were modeled, as valid indices to establish conditions for boating activities on the Maipo River.

This analysis showed that the Project shall not interfere with tourism activities conducted on the Maipo River, in view of estimates that in a dry year, the magnitude of variations in flow rate and water depth will not cause interference with boating activities.

For more information, see **Annex 17 of Addendum 1**.

- (1) The hydrological analysis used to evaluate reductions in flow rate is based on a statistical record going back 50 years, thus ensuring that seasonal and annual variations are incorporated into the analyses conducted.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and

the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**.

The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayes, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions.

The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS**.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, roadworks, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

Remark N° 403

1 ENVIRONMENTAL COMPONENT:

WATER Hydrological Aspects

17. During the process of the previous PHAM (submitted in 2007), the authorities requested climate monitoring as a direct measure to "evaluate" the modification of surface watercourse". Regardless of whether or not the Project Owner plans to install meteorological stations, this is necessary as a measure to evaluate variations in surface watercourses - especially in view of the "increase in the altitude of the 0 °C isotherm by 300 to 500 m, as against the current climate".

It should be born in mind that this increase in the elevation of the isotherm will lead to a rise in the rate of melting of glaciers, directly affecting water reserve for agriculture and livestock activities and threatening the sanitary equilibrium of the Metropolitan Region.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04.04 Monitoring and control of flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility

(**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility

(**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	Rain gauge station		6,259,100
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		

Colorado River Intake control station	389,063	6,292,501
Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the

PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 404

1 ENVIRONMENTAL COMPONENT:

WATER Hydrological Aspects

18. The Project Owner should comment on the following considerations:

- a) The real estate development known as El Quillayal is located on the south east bank of the Colorado River, and consists of lots for houses owned by those who purchased their properties due to the area's scenic beauty. Most of these properties will decline in value due to intervention under the project. In addition to Route G-345, the old Alfalfal road also exists and is widely used by the public and by tourists, over its first kilometer. This road also serves a large number of properties, and much of its length offers scenic views of the river.
- b) The ecological flow rate is miniscule, and water flow is expected to drop to zero downstream of the Maurino and Manzano channel intakes.
- c) With reference to tourism projects, the Instituto Río Colorado should be mentioned, as it will be seriously affected by the project. It should also be mentioned that a project exists to create a sanctuary, the "COLORADO RIVER SANCTUARY", which constitutes a significant development project for the district with the creation of some 40 local jobs. A number of families living in the settlements of Maitenes and El Alfalfal earn their livelihood through tourism activities such as horse rides and guided hikes through areas close to the sites where project installations are to be constructed - including some state-financed activities. The Project Owner should also indicate the impact on each of these activities through flow rate reductions in the Colorado River.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes,

El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents. RSG Risk**

The Project Owner possesses a general risk prevention strategy that imposes certain measures on the Project during its different stages of advance. This strategy features the following components:

- a) Measures incorporated into the Project's engineering design.
- b) Systematic verification of compliance with applicable regulations
- c) Establishment of restricted areas
 - c.1) Area restricted due to their archeological, paleontological, or heritage value
 - c.2) Area of natural value that requires protection by the Project
 - c.3) Officially protected area.
- d) Expert supervision during construction
- e) Training regarding environmentally sensitive issues
- f) Internal risk management and accident prevention programs
- g) Separation of works installations and encampments

For further information on each of these points, please see **Chapter 7 of the EIS**, which specifies the **Environmental Management Plan**, the **Risk Control and Prevention Plan** designed for the Project, the safety measures to be adopted in light of the risks identified, and, finally, the **Accident control plan**, to be activated in the event of the failure of the preventive measures taken by the Project Owner. Furthermore, **Annex 32 of the EIS** presents the **Risk and Contingency Prevention Plan** for contractors.

SOC.03 Decline in land value

Road conservation activities planned shall not involve urban areas. Road conservation activities shall be implemented mainly along mountain roads, particularly on the Alto Volcán area and El Yeso Reservoir access routes (Route G-25 and Route G-455, respectively).

Road widening actions are not planned, given that, according to the Project's Basic Engineering Studies, the roads subject to conservation works have a wide enough roadway for the passage of trucks, as defined by the Highways Department; therefore, no expropriation of land will take place.

With regard to land values, it can be stated that lots located alongside Route G-345 have increased in value significantly with the development of the access route to Maitenes and Alfalfal.

TUR.01 River sports

During the operations phase, the activities of the PHAM shall not directly or indirectly interfere with tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. Furthermore, the PHAM shall have no significant effect on boating activities on the Maipo River as a result of reductions in river flow rate; an analysis is presented in Annex 17 of the Addendum modeling a number of hydrological scenarios (1), concluding that the PHAM shall not affect the current situation in rafting and kayaking activities conducted in the area between San Gabriel and San José de Maipo.

In order to establish an analysis comparing the current Maipo River boating situation with predictions for the situation with the Project operational, the variables of flow rate, river width, and water depth were modeled, as valid indices to establish conditions for boating activities on the Maipo River.

This analysis showed that the Project shall not interfere with tourism activities conducted on the Maipo River, in view of estimates that in a dry year, the magnitude of variations in flow rate and water depth will not cause interference with boating activities.

For more information, see **Annex 17 of Addendum 1**.

- (1) The hydrological analysis used to evaluate reductions in flow rate is based on a statistical record going back 50 years, thus ensuring that seasonal and annual variations are incorporated into the analyses conducted.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails,

mountain refuges, signage, etc.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayes, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions. The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS**.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, roadworks, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

Remark N° 405

1 ENVIRONMENTAL COMPONENT:

WATER Hydrological Aspects

19. With regard to the forebay to be built in the Aucayes Stream Basin, at the Hacienda Río Colorado, the Project Owner does not present a detailed technical proposal or information on variations in the area's natural state resulting from the construction of the forebay, such as impacts on the geological structure of the Aucayes Stream, the basin's hydrological dynamics, and the abundant plant and animal life that exists in the area; similarly, no information is provided regarding the potential risks caused to the environment and local residents as a result of leaks, overload, or overfilling during the operations phase. This information is particularly important in view of the presence of high-value plant communities in the Aucayes Stream system, and the location of the settlement of Maitenes at the base of the stream - in an area that the Project Owner itself defines as a zone of mass flow removal. In the event of a transient phenomenon, how can the Project Owner guarantee that the forebay will not overflow? For instance, what would happen in the event of the abrupt closure of stoplogs or valves? The Project Owner is reminded that the town of Los Maitenes is located on one bank of the Aucayes Stream, and is in a high risk situations in the event of landslides or flash floods.

Furthermore, the Project Owner should agree that if it indirectly affects surface or underground watercourses through the construction or operations of works in the Aucayes Stream, it will offer a commitment to conducting applicable mitigation actions to maintain ecological flow rates and normal functioning of the Aucayes Stream.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS**.

This section presents information characterizing the basins and tributaries of the Volcán, Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex

13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS**.

AGU.03.02 Geology

The baseline studies used in determining the geological characteristics of the Project area are presented in **Section 5.3.6 of the EIS**. Additionally, the **hydro-geological baseline studies** for the Project area are presented in **Section 5.3.5.3 of the EIS**. Complementary information is also provided in **Annex 45 of the EIS**.

Both of these studies start with general background information on the area where the Project is to be installed, going on to present a detailed description of the

geological and geomorphological characteristics of specific areas where Project works or activities are planned.

Complementary information is provided in **Annex 8 of the Addendum**.

AGU.03.03 Underground water

Underground water will not be affected in any way by the operation of the Project. This is the case because the underground water flow capacity in each sector of the aquifer associated with the Maipo River is much lower than the minimum flow running through each section of the river, and therefore under all circumstances the aquifers shall remain saturated. Thus, underground water sources present in the area shall also not be affected.

The PHAM plans to construct 70 km of tunnels, of which approximately 50 km correspond to headworks or hydraulic pressure tunnels, the remainder being access tunnels for use during construction of the project and for subsequent operation of the power plants (see **EIS Chapter 5, Section 5.3.5.3**).

Most of these tunnels have been designed to operate at variable internal pressures, with a maximum achieved at certain points of a little more than 450 m. The design requirement for these tunnels is that the lower limit of principal compression in the surrounding rock medium is always less than the operating pressure, such as to maintain a sufficient safety margin to prevent alterations in natural permeability dynamics through hidrojacking. In areas where this design principle is not guaranteed, the Project plans to install impermeable tunnel linings (**EIS, Annex 45.4**).

During the excavation of these tunnels, it is possible that the work front may have to pass through permeable rock strata - leading to seepages of water into the tunnel, the magnitude of which will depend on the permeability of the rock, the depth of the tunnel, and the level of the water table. In some areas, tunnel wall treatments may have to be applied in order to prevent water transfer into or out of the headworks tunnels.

The Project does not plan to make use of any water seepages that may arise, in the generation of electricity. Additionally, the overarching design principles underpinning the Project are oriented towards limiting seepages during construction, in order to establish suitable conditions for efficient tunnel excavation activities. The same principle applies to methods to limit the infiltration of water from the tunnels into the rock mass, thus avoiding water loss during operations.

Additionally, these procedures guarantee that any groundwater that may intercept the tunnels shall suffer no change in its natural hydrological dynamics, or impact on any foreign components or water other than the water entering the system (**EIS, Annex 45**). Special attention will be paid to the quality and characteristics of any water that may eventually return to the natural water system through the tunnel access windows, and therefore construction contracts will specify measurements that must be made and the treatment that shall be required for subsequent disposal of such water, in order to ensure compliance with the quality requirements for water discharge into natural watercourses, under regulations currently in force.

In the event of seepages of water at high temperature and possible acidic composition, it is important to make clear that in general there shall be no major differences in the methods used to render the tunnel walls impermeable. During all site surveys conducted, research boreholes and surface geological maps produced to date applying to the areas through which the tunnels will pass, no evidence whatsoever has been found to lead to any prediction of the presence of water at high temperatures, or with mineral or acidic contamination. As additional background information, during the construction of the Alfalfa Plant - with the excavation of 35 km of tunnels - no events similar to those indicated above occurred. Notwithstanding the above, the specification establish that, in locations located close to potentially critical areas, the contractor must drill survey boreholes of between 25 m and 30 m in length ahead of the tunnel work front, in order to gain early warning of seepage problems and thus be able to apply impermeable tunnel wall treatments as required. See **EIS, Annex 45.4**.

AGU.04.05 Drought from infiltration of minimum ecological water flow

The Project's potential indirect impact on groundwater in the area of influence has been evaluated in detail in the report attached as **Annex 25 of the EIS**. According to this analysis, all aquifers located throughout the areas of influence will not be affected in any way. This is the case because the underground water flow capacity in each sector of the aquifer associated with the Maipo River is much lower than the minimum flow running through each section of the river, and therefore under all circumstances the aquifers shall remain saturated. Thus, underground water sources present in the area shall also not be affected.

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.01 Regulations

The Project Owner shall comply with all legal environmental and sector-based regulations and requirements in force and applicable to the Project during the different phases of its development. The Project Owner has guaranteed compliance with the general and specific

regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and compliance with sector environmental permits.

Environmental regulations that apply to the Project have been identified

based on its activities' potential environmental impacts affecting flora and fauna. The full extent of these regulations is included in **Chapters 3 and 4 of the EIS, and in Section 2, Question 1 in Addendum 1.**

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempe Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum.**

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neopteris curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Liolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopus cyanus*). For additional, complementary information, see **Addendum, Annex 4.**

Remark N° 406

1) Art. 8.2.1.1 to 1.4.

PROTECTION OF THE BANKS OF NATURAL WATERCOURSES:

20. The PHAM clearly contravenes the Metropolitan Region Master Plan (PRMS), and is therefore poorly situated in legal terms; the submission of an EIS does not absolve it of legal requirements that it is infringing, and this Municipal Government therefore wishes for this point to be clarified in its entirety.

As the public services state, the community of San. José de Maipo is protected under the PRMS; it contains sites listed as priority areas under the Biodiversity Conservation Strategy, and is internationally recognized as a critical biodiversity hotspot. The Project Owner's responses regarding information gleaned from surveys of the area to prevent environmental impacts are insufficient, as they are limited to a listing of procedures: an environmental pre-feasibility study, submission of an EIS, compliance with citizen participation requirements, modifications to project engineering, etc. However, the EIS does not make clear how each measure is to be applied in each of the project's areas of influence; (with the sole exception of a more exhaustive study of the El Morado Natural Monument, in Annex 3 and the plan in the addendum)

Given that the project's intakes, water conduits, power plants, roads, and some spoil (muck) disposal heaps will be conducted or located in the Volcán Land Holding, the Hoya Laguna Negra and San Nicolás Stream Land Holding, Hijueta Lot N° 3, the Hoya Embalse el Yeso Land Holding, the San Francisco de Lagunillas Land Holding, and Hacienda Río Colorado, all of which are declared to be level 4 or 5 priority sites in the Metropolitan Region Biodiversity Strategy; and that these land holdings are also protected as areas of scientific interest, under Ministry of Mining Decree 78, issued in January 2006; the Project Owner must submit information on the depth and diameter of the tunnels, the rock strata through which the tunnels will pass underneath the land holdings known as El Volcán, Hoya, Laguna Negra y Estero San Nicolás, Hijueta Lote W 3, Hoya Embalse el Yeso, San Francisco de Lagunillas, and Hacienda Río Colorado. Additionally, specific information is required on the particular measures to be taken to prevent water seepage into and out of the tunnels, and to prevent the degradation of underground and surface water resources present in the area. Similarly, information is required regarding measures to protect the soil, plants, and animal life of the areas included in these land holdings if affected by channels, tunnel exits, and roads.

It should be pointed out that the Project Owner has only provided level of information when required to do so, with regard to the El Morado Natural Monument; this scope should be extended to cover the aforementioned priority sites, in conformity with planning regulations in force and rules for the Cajón del Maipo valley - the PRMS (until the approval of the district master plan, regulating matters stipulated in Article 2.1.10 of the Ordinances on the Urban Development and Construction Law); a number of limitations and prohibitions affect the installation of a project as described by the Alto Maipo Project Owner, as listed below. Additionally, protective buffer zones exist, and are also used for recreation, as ventilation routes, and as biological corridors for wildlife.

Major permanent watercourses: Buffer zone of at least 200 m minimum width parallel to either bank of the watercourse, and a radius of at least 400 m around the source. This category includes the following watercourses: Maipo River, Mapocho River, Angostura River, Puangué Stream, Alhué Stream, Yali Stream, Paine - El Escorial Stream.

Minor watercourses: Buffer zone of at least 100 m minimum width parallel to either bank of the watercourse, and a radius of at least 400 m around the source. If native vegetation exists on the edges of the watercourse, the buffer zone will include all such vegetation located up to 200 m from the banks.

This category includes all natural watercourses shown in maps RM PRM-02pTMI CBP-1.A and 1.C, except for those specifically mentioned as belonging to the previous category.

The width of the buffer zones stipulated for the two categories of watercourses indicated above may be reduced by up to 30%, based on a Specific Technical Risk Study, duly approved by the competent body.

Based on the same study, and only where permitted, the width of the buffer zone may be reduced by up to 60% so long as trees are planted throughout the remaining buffer zone, in conformity with a Reforestation Plan approved by the Agriculture SEREMI, based on a technical report issued by the competent Ministry of Agriculture body or bodies, as applicable, indicating the tree species to be planted, the density and characteristics required in accordance with tree size and level of development, in order to ensure their survival. Road and transport infrastructure will not be permitted in this reforestation area.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

MAR Muck

The PHAM plans to construct approximately 70 km of tunnels. The excavation of these tunnels will generate inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of inert material produced in road building and the construction of buried conduits.

This muck material will be deposited in the 14 muck disposal heaps that the Project plans to create. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria. For more information, please see **Annex 6 of the EIS** and **Annex 3 of the Addendum**.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1) **Chapter 3 of the EIS** provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

PRO.03.03 Encampments and works installations

For details on the creation of encampments and works installations, please see Chapter 2, Section 2.3.2.4 in the EIS.

For information on PHAM encampment and work site approach routes, see EIS, Chapter 2, Table 2.1.2,

For information on regulations, see Chapter 3 of the EIS and Annex 33, General Operating Regulations for Encampments and Work Sites.

For information on the management of waste produced at work sites and encampments, see Annex 18 of the EIS, "Site Installation Waste Management Plan".

For information on the discharge of treated wastewater, see Response 26 in the Addendum.

For information on human consumption of water at encampments and works installations, see Chapter 2, Section 2.3.2.4, parts b and i.

For an assessments of the impact of the creation of encampments and works installations, monitoring methods, and conditions, see Chapter 6 of the EIS.

TUR Tourism

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation

shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

Remark N° 407 TECHNICAL REGULATIONS FOR URBAN AREAS:

In urban areas affected by natural watercourses, the protective buffer zone will have a minimum width of 50 m, adjacent and parallel to each bank, as applicable.

The following land uses will be permitted in this buffer zone: parks, leisure equipment, sports areas, tourism trails, and cycle paths. Additionally, up to 30% of the buffer zone may be used for road infrastructure.

If the aforementioned 50 m buffer zone already contains largely consolidated urban development in advance of the entry into force of the plan, as recorded in a technical report issued by the Urban Development Advisor, the area may be reduced as established in the corresponding risk study, which must be duly approved by the competent body. This reduction of the buffer zone must be conducted following a favorable report from the Ministry of Housing and Urban Development Regional Secretariat, which shall be understood to form an integral part of this plan.

These Risk Studies may form part of the corresponding District Master Plans, as established in the General Ordinance of Urban Development and Construction, or may be prepared by the owners of land holdings affected by this regulation.

In cases where specific regulations for Areas Adjacent to Watercourses are stipulated in Chapter 5.2

of the Metropolitan Parks and Recreation System, the territory set aside for park areas cannot be subject to reduction as a result of risk studies that permit the reduction of the riverside protective buffer zone, or through the construction of river defenses.

Natural Watercourse Master Plans:

Where Natural Watercourse Master Plans exist, and in the event that the construction of a project interferes with the management plans defined therein - with the objective of conserving natural watercourses - the corresponding Project Owner shall be responsible for updating the Master Plan in question, and implementing the measures necessary to make these changes possible, accepting liability for all consequent costs (23c).

CAJON DEL MAIPO AREA: District of San José de Maipo.

Correspond to the streams shown in map RM-PRM-92-1.B., for which a buffer zone is established with minimum width 40 m, measured on each bank.

Thematic responses

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable

to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1)

Chapter 3 of the EIS provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

Remark N° 408

2. Art. 8.2.1.4.

b) GEOPHYSICAL RISKS ASSOCIATED WITH RECURRING FLOODING

Corresponding to areas located close to the edges of permanent natural watercourses, streams, and/or channels, at risk through erosion or subsidence arising as a result of increases in the volume and velocity of water flow.

For regulatory purposes, the following areas are identified, in accordance with maps RM-PRM-92-1A. and RM-PRM-95-CH.1.C.: Areas associated with the Mapocho River, Maipo River, Zanjón de La Aguada Channel, Las Cruces Stream, Lampa Stream and associated watercourses, Colina Stream and associated watercourses, Chacabuco Stream, Santa Margarita Stream Til-Til Stream, Polpaico Stream, and Carén Stream. (36ii), (36iii).

These areas may only be developed as park areas, becoming part of the Metropolitan Parks System, with such parks laid out such that their vegetation does not affect the watercourse.

In turn, urban developed areas and areas suitable for urban development subject to such risks may request that the usage zoning as parkland of the risk area identified be changed. This is applied by means of a modification of the District Master Plan, implying an increase in land occupation and population density, which must be grounded on specific technical studies approved by competent bodies, that include the conditions and works necessary to ensure that the risks identified in these areas are minimized.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than

sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area. The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation**

equilibrium" (AGU.06.01), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted.

It can be concluded that the Maipo River system can be managed such that, with the project operations, present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them.

Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

RSG Risk

The Project Owner possesses a general risk prevention strategy that imposes certain measures on the Project during its different stages of advance. This strategy features the following components:

- a) Measures incorporated into the Project's engineering design.
- b) Systematic verification of compliance with applicable regulations c) Establishment of restricted areas
 - c.1) Area restricted due to their archeological, paleontological, or heritage value
 - c.2) Area of natural value that requires protection by the Project
 - c.3) Officially protected area.
- d) Expert supervision during construction
- e) Training regarding environmentally sensitive issues
- f) Internal risk management and accident prevention programs g) Separation of works installations and encampments

For further information on each of these points, please see

Chapter 7 of the EIS, which specifies the **Environmental Management Plan**, the **Risk Control and Prevention Plan** designed for the Project, the safety measures to be adopted in light of the risks identified, and, finally, the **Accident control plan**, to be activated in the event of the event of the failure of preventive actions taken by the Project Owner. Furthermore, **Annex 32 of the EIS** presents the **Risk and Contingency Prevention Plan** for contractors.

Remark N° 409

3) Art. 8.3.1. AREAS OF NATURAL VALUE

The following dispensations are issued for the application of the specific regulations contained in this plan:

- Ecological Preservation Areas
- Ecological Preservation Areas with Controlled Development
- Ecological Rehabilitation Areas
- Priority Protection Areas
- Wetland Areas (28).

Art. 8.3.1.1. Ecological Preservation Areas.

These are areas that will be kept in their natural state, in order to preserve and contribute to the environment's quality and equilibrium, as well as to preserve landscape heritage. Integral parts of these areas include: the upper reaches of river basins and the smallest hydrological structures; water reservoirs and natural watercourses; areas for the preservation of snow resources, as both a source of drinking water and to prevent the construction of installations on ski slopes; mountain peaks and crags; enclaves of plant life and animal refuges; and key landscape features. This area, and corresponding legal measures, shall extend to zones featuring the characteristics of Protected Wilderness Areas, National Parks, National Reserves, Protected Wilderness Area Complementary Zones, Nature Sanctuaries, Sites of Scientific Interest, and all areas classified as Natural Reserves, Natural Monuments, and Existing Protected Areas. Activities shall be permitted in these areas only if they ensure the preservation of the sites' natural values, with usage restricted to scientific, cultural, educational, leisure, sporting, and tourism uses, with minimal installations and/or constructions necessary for such uses. The regulations that apply to these activities, and complementary actions - public parking, commerce, health, communications, and safety equipment - will be defined by the Metropolitan Regional Secretariat of the Ministry of Housing and Urban Development on a case-by-case basis, in view of specific characteristics and applicable studies approved by the corresponding competent bodies. The projects will be approved only when an Environmental Impact Study is presented, prepared by the interested party, assessed by the applicable bodies, with the subsequent issuance of a favorable resolution. Agricultural, livestock, and forestry activities may be conducted in a controlled manner - in such cases, the corresponding competent bodies shall set appropriate conditions, issued through plans approved by these services that must include corresponding control and monitoring systems. The application of these systems and regulations shall be required for the authorization of such activities.

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils. In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

SUE.02 Soils, meadows, and wetlands

The Project Owner has conducted a number of studies with the aim of characterizing the vegetation of summer grazing areas (La Engorda) (see details in Addendum 1, Annex 6, and in Chapter 5 of the EIS), as well as flora and vegetation studies in the Project's area of influence (EIS, Chapter 5).

These studies contain information compiled in fieldwork campaigns conducted in Fall 2005, Spring 2006, November 2007, March 15 and 16, 2008, and September 2008, which add to the body of knowledge available regarding vegetation in these areas.

The Lo Encañado area shall be assigned a status of controlled access area for works contractors at all times: it shall not be subject to any intervention whatsoever. For more information

on vegetation areas that could be affected by the construction works, and to learn about mitigation measures proposed by the Project Owner, you are advised to review Annex 42 of the EIS and

Annex 6 of the Addendum.

With regard to environmental regulations that apply specifically to vegetation and plant life, the Project Owner shall be subject to: **Supreme Decree 366** (Exploitation of Tamarugo, Carob, Chañar, Guayacán, Aextoxicon, Charcoal, Acacia, Boldo, Maiten, Litre, Bollen, and Quillay). This legal instrument governs the felling of trees and bushes.

Supreme Decree 4363 and D.L 701 (Approving the Definitive Text of the Law on Woodland and Regulations on Forest Promotion).

Article 2 of the Woodland Law establishes an obligation that land classified as for preferential woodland land use, as well as natural and artificial woodlands, are subject to woodland management plans approved by the National Forestry Commission (CONAF). Furthermore, Article 21 of Decree Law 701 establishes that any felling or usage of native woodland shall be subject to the CONAF's prior approval of the corresponding management plan.

Decree 82 (Prohibiting the Felling of Trees and Bushes in Indicated Andean High Mountain and Foothill Areas)

Article 102 Sector Environmental Permit (Permit for the felling or exploitation of native woodland, in any type of land, or plantations located in land with preferential characteristics for woodland use).

For further information and analysis on the aforementioned regulations and permits, as applicable to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see Sections 3.2.6 and 3.3.7 in Chapter 3 of the EIS.

Remark N° 410

4.) Art. 8.3.1.4. PRIORITY PROTECTION AREAS

These areas contain valuable ecosystems that are unique and significant for the country's biodiversity, genetic resources, landscapes of remarkable beauty, and, in general, natural or cultural assets that belong to regional or national heritage. Such areas also play a role in climate regulation, reduction of pollutant concentrations, ventilation routes, biological corridors, and wildlife interchange and migration spaces.

The categorization of Priority Protection Area has been granted to areas that are legally protected under the National Protected Wilderness Areas System managed by the State body SNASPE, or under another Supreme Decree issued by the Ministry of Agriculture and Ministry of Mining, as indicated below. Notwithstanding the list of activities permitted in such areas, they include smaller zones - located mainly in mountain valleys, as shown in the maps referred to above - which are regulated under specific regulations established in this plan.

These areas shall be managed in accordance with applicable legislation in force, permitting activities that are compatible with the management objectives for each category, ensuring the conservation of their natural assets. SNASPE protected areas, which in the Province of Melipilla constitute the Roblería del Cobre de Loncha area in the District of Alhué, activities will be adapted in accordance with Supreme Decree 531/1967, which ratifies the "Convention on Nature Protection and Wildlife Preservation" as a Chilean Law, defining the category of National Reserve; and Law W 18.362/84 passed by the Ministry of Agriculture, creating the SNASPE. Furthermore, parties interested in implementing projects, plans, or constructions in this area must apply to the Corporación Nacional Forestal (CONAF) which, in conformity with legislation in force and with its remit of powers and competences, is tasked with the administration of the SNASPE.

The objective of the National State-Protected Wilderness Areas System - SNASPE - is the protection of environments that are representative of the country's natural ecological diversity (animal and plant communities, and natural geological formations).

SNASPE Complementary Units include Plant and Animal Ecosystem Protection Areas and Areas of Scientific Interest:

- Plant Ecosystem Protection Areas are instituted to protect significant selections of plant life that represent a habitat for regional wildlife.
 - Animal Ecosystem Protection Areas are areas with prohibitions against hunting due to their importance for the conservation of animal diversity, and also constitute areas of outstanding scenic value.
- Areas of Scientific Interest possess highly significant natural and cultural characteristics, and their fundamental purpose is to prevent mining activities that could affect such areas.

As established in Article 3 part p of the Environmental Impact Evaluation System (S.E.I.A.) Regulations, the implementation of works, programs, and activities in areas placed under official protection - including all land classed as Priority Protection Areas - must be submitted to the SEIA. Prior to the granting of municipal permits for projects to be implemented in these areas, they must have received an opinion in favor from COREMA RM, an opinion in favor from the Ministry of Housing and Urban Planning SEREMI and the Agriculture SEREMI, and they must comply with all specific requirements demanded by the competent Ministry of Agriculture body or bodies.

Furthermore, such activities shall be subject to the general conditions set forth in Article 8.3.3 sections a) to h) on Mountain Chain Restricted Areas.

Agricultural, livestock, and forestry activities may be conducted in a controlled manner - in such cases, the corresponding competent bodies shall set appropriate conditions, issued through plans approved by these services that must include corresponding control and monitoring systems. The application of these systems and regulations shall be required for the implementation of such activities. For all Priority Protection Areas except for Areas of Scientific Interest, mining activities shall be administered in accordance with Article 6.2.2

of this Ordinance, on Mining Projects, and the technical conditions set forth above shall not apply. However, mining projects - including exploration and production - shall be subject to approval by the Environmental Impact Evaluation System (S.E.I.A.) when applicable, as indicated in part i) of the S.E.I.A Regulations. Additionally, infrastructure will be permitted in these areas pertaining to the road network, energy distribution, communications, and the abstraction and distribution of drinking water.

Finally, the Project Owner has also failed to take climate change into account. As indicated in point 1.1.16, the Government of Chile has approved the National Climate Change Strategy, which recognizes the vulnerability of Chile's water resources, particularly in the north-central zone. Within this framework, it is vital that the particular situation of this project in terms on its environmental impact on this priority biodiversity conservation area is assessed in a carefully planned manner over a long term timescale. In this context, the project should be evaluated in terms of potential increases in risk of desert encroachment in the area.

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds

is included in **Annex 14 of the Addendum**.

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neoporteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Lilolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopus cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

Remark N° 411

Ecological flow rate

16. With regard to the methodology used to calculate flow rates, it should be pointed out that the study on terrestrial wildlife makes fundamental contributions for the establishment of ecological flow rates compatible with the conservation of the area's wildlife, with particular emphasis on species for which insufficient data exists to define a conservation status, as classified by the SAG and identified in the study on the area. Therefore, the study on land fauna should be completed in advance of establishing these ecological flow rates, with criteria restricted to hydrological considerations.
- Three vulnerable and endangered species would be directly affected by the implementation of the project:
1. Torrent Duck (*Merganetta armata*)
 2. Frangel or Olivillo (*Kageneckia angustifolia*)
 3. Guayacán (*Porlieria chilensis*)
- Of these species, the Torrent Duck would be most severely affected, as - according to the information presented by the Project Owner itself, this species is to be found in the Yeso River (page 32), for which the ecological flow rate proposed was calculated at 1 m³/s. Taking into account the information cited by the Project Owner itself (page 33) "... these birds are associated exclusively with mountain rivers and streams, where they prefer to feed on benthic aquatic invertebrates, which they hunt by diving in strong currents (Carboneras, 1992). Historically, this species has been considered scarce, perhaps as a result of its specialized habitat requirements (Phelps & Meyer, 1978) and its need for rivers with high water quality (Johnsgard, 1966)".
- This description leads to the conclusion that the habitat of the Torrent Duck will be violently altered with no possibility of recovery, as the species is - as the Project Owner puts it - "notably territorial".
- The decline in flow rate in the Yeso River will destroy the habitat of this endangered species, in one of the few sites where it can be found in the Metropolitan Region. This clearly contravenes the requirement established under the Metropolitan Region Biodiversity Conservation Strategy, which designates the Yeso, Volcán, and Maipo river basins as Priority Conservation Sites - the corresponding implementation plan is established in the Andean Santiago Plan. These legal instruments allow Chile to meet the commitments to which it has agreed under the Convention on Biodiversity Conservation. The Project Owner is requested to conduct appropriate studies that show that the ecological flow rate for this watercourse will be adequate for continued use as habitat by the Torrent Duck - which is not shown in the EIS as submitted, as the ecological flow rate presented by the Project Owner is as measured at the intake, whereas for this particular species it should be measured and guaranteed at the confluence with the Maipo River.
18. As these birds are associated exclusively with mountain rivers and streams, where their preferred food source consists of benthic invertebrates that they hunt by diving in powerful currents (Carboneras, 1992), the species has historically been observed to be of low abundance - perhaps as a result of its specialized habitat requirements (Phelps & Meyer de Schauensee, 1978) and its need for rivers with high water quality (Johnsgard, 1966). It can be assumed that when flow rate in the Yeso River drops to the ecological flow rate (10% of the current flow), there is no possibility that this species will continue to find the territory and food requirements necessary for its survival. Without the structural conditions that constitute its habitat, the consideration of mitigation measures becomes untenable, and any solution must relate to the replacement of individuals of this species. The same applies to the Black Spiny Chest Frog (*Asodes nodosus*).
19. With regard to the sclerophyllous woodland present around the Colorado River and the Aucayes Stream, the Project Owner is requested to clarify whether species are present that could be more severely affected by a decline in flow rates, particularly those that are found in damper areas.
- The Project Owner has stated that "the Aucayes Stream will not be affected by the Project. However, in any case to date this stream shows no impact on plant species or communities growing close to the stream banks, even though its flow rate has suffered a reduction since the Maitenes Plant became operational".
- These factors clearly contradict the assertions made by the Project Owner itself, where, in other paragraphs of the PHAM documentation, it states that the Project's main works layout will remain largely unaffected, with the sole additional requirements of extending an access road for the Alto Aucayes area (by approximately 8 Km.) and constructing a forebay. Thus, the new project layout eliminates both the Lo Encañado Lake access road (approximately 3 Km.) and the connection installation related to this road, which was also originally planned (Annex 6 of Addendum 1)". In view of the above, and given that the Project Owner will replace the function originally to have been fulfilled by the El Encañado with a forebay with a similar water capacity in the headwaters of the Aucayes Stream, the Project Owner is requested to clarify the information submitted, and to determine the project's level of intervention in the Aucayes Stream, and the vegetation and associated animal life found there.
20. The Project Owner promises to take population measurements for the Torrent Duck, Black Spiny Chest Frog, and Cururo, but this request is not underpinned with any binding agreement. It is mentioned that these studies would be conducted once the construction of the project had begun, agreeing only to form an agreement with the SAG regarding methodology. Here, it must be assumed that species that require environmental conditions dependent on the force of the river's current are able to tolerate a 90% drop in water volume, as a quantitative decline in environmental parameters would be sufficient to cause an irrecoverable environmental impact that could clearly not be mitigated.
- In another sense, a population study conducted with no baseline for comparison merely describes the population situation under the prevailing environmental conditions at the time that the study is conducted. In other words, the population study will be a post-mortem for the species in this location.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are

relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3**, and **Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempe Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neopteris curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Liolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

Remark N° 412

2. ENVIRONMENTAL COMPONENT: SOIL.

2.3 Muck

21. The Project Owner should define the methodology to be used to monitor what it defines as "sampling during construction", in order to detect the existence of acidic or alkaline drainage. It should also present the design to be used for pools to be used to neutralize any chemical issue that may arise at each of the planned muck disposal heaps. It is vital that the location of these pools must be specified, as many of the muck disposal heaps are to be located close to natural watercourses and are therefore at risk of contamination.
22. The Project Owner should submit a contingency plan for use under such circumstances, as the measures proposed are not sufficient. The Project Owner should also present the design to be used for the protective element of "artificial slope base barrier" for each of the muck disposal heaps planned under the project, taking into account the proximity of natural watercourses. If protection cannot be placed in such a way as to safeguard the watercourse, the muck disposal heap should be relocated.
24. Muck Disposal Heap 1 is planned to be located in the area known as the Valle del Arenas, which - in contrast to statements made by the Project Owner - does indeed possess "natural value", as well as value for tourism and paleontology. Thus, in view of the scale of the works planned, the Project Owner should at least present a survey of bird life inhabiting the area where it plans to install its muck disposal heap and encampment, with a plan to monitor and recover affected wildlife.
From a tourism perspective, it should be pointed out that the Arenas area has potential for the development of sport climbing, notwithstanding the omission by the Project Owner of the site known as "Boulder del Arenas".
The Project shall affect sites of incalculable heritage value, and yet information is provided on only some of these sites, identified in the Baseline. Three areas are identified as featuring resources of cultural interest: Las Morrenas and Camino del Inka in the Lo Encañado Lake area, and the site known as Aucayes 1 in the Colorado River - Aucayes Stream area, as well as a site of paleontological interest as Alto Volcán. What guarantees does the Project Owner provide to ensure that contractor companies respect this archeological and paleontological heritage? How many professionals will be tasked with providing training or monitoring of contractor companies? What legally-backed institution will monitor works and determine the significance of sites and remains discovered?
What institution will provide oversight in order to ensure legal minimal compliance? Contractual requirements affecting contractor companies are not sufficient.
Where plans call for the construction of roads, intakes, muck disposal heaps, temporary encampments, and other such sites. The company fails to recognize the existence of a site of immense paleontological value that is unique in Chile: 150 million year old dinosaur footprints... Under the protection granted under current legislation, this area should be protected and no commercial project that would affect it should be conducted. No information is available on such ichnofossils of this age in Chile, so studying them could yield a major contribution to Chilean and global paleontology (Law 17,288 Title I - Art I. Title 111 Art. 10 - 12 - 13). The Project documentation omits information on the existence of geological structures that are unique in Chile and that are of incalculable value, which currently constitute an "open air museum" and that could be subject to irreparable damage through the construction of the PHAM. These formations include a number of types of mudcrack and raindrop structures with ages between 155 and 150 million years. A detailed survey should be conducted to document these features, and the area should then be given protected status due to the scientific value of these structures, which are unique in Chile.
The Project Owner should therefore present the baseline for the area in question, considering element exposed at the site to assess whether the installation of planned surface works there is justified, bearing in mind that this is not a degraded area, but rather an area of "high natural value". In view of this information, and further data that can be compiled, the Project Owner should consider the relocation of SAM1.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03.02 Geology

The baseline studies used in determining the geological characteristics of the Project area are presented in **Section 5.3.6 of the EIS**. Additionally, the **hydro-geological baseline studies** for the Project area are presented in **Section 5.3.5.3 of the EIS**. Complementary information is also provided in **Annex 45 of the EIS**.

Both of these studies start with general background information on the area where the Project is to be installed, going on to present a detailed description of the geological and geomorphological characteristics of specific areas where Project works or activities are planned. Complementary information is provided in **Annex 8 of the Addendum**.

F&F Biodiversity Impact Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

MAR Muck

The PHAM plans to construct approximately 70 km of tunnels. The excavation of these tunnels will generate inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of inert material produced in road building and the construction of buried conduits.

This muck material will be deposited in the 14 muck disposal heaps that the Project plans to create. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria. For more information, please see **Annex 6 of the EIS** and **Annex 3 of the Addendum**.

MAR.04 Impact

All of the measures adopted for the creation, operation, and abandonment of the muck disposal heaps will be implemented by the Works Contractor. Gener will undertake an environmental monitoring plan addressing the management and usage of the sites, which will include site inspections and periodic review of site entry records.

Rainwater will be managed using specially designed channeling works, the details of each of which are indicated in the plans attached in Annex 6 of the EIS.

The Project Owner's reiterates its commitment to undertake an exhaustive program to rescue low mobility fauna in the area of direct influence of PHAM works (including the area to be occupied by the 14 sites where muck, spoil, and earth will be disposed of in heaps). This wildlife rescue will require the application of capture techniques suitable for small mammals, reptiles, and amphibians. **Annex 4 of Addendum 1** presents the Wildlife Rescue and Relocation Plan.

Even following surveys ruling out the presence of archeological or paleontological sites or finds in the muck disposal heap sites, the PHAM also includes a series of measures designed to prevent any intervention in sites with heritage value, with the implementation of restricted areas and training programs for contractor personnel. For more information, see **Annex 14 of Addendum 1 and Annex 33 of the EIS**, "Restricted areas".

MAR.05 Composition and Hazardousness

Although the waste material produced from tunneling activities will be inert - in the construction of tunnels for the Alfalfal Plant, where 35 km of tunnels were excavated, no evidence was found of material that could lead to acidic or basic drainage in contact with rainwater - the PHAM includes a management plan applicable to water that may be produced from contact between muck or waste rock and rainwater or snow. For further details, see Annex 6 of the EIS.

The Project Owner plans to take measurements to assess the possibility of acidic drainage at the muck disposal heap sites, as indicated in **Annex 6, Section 5 in the EIS and Response 10 in Section 9 of Addendum 1**. The actions will form part of the Environmental Monitoring Plan, and will be preventive rather than response actions.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned

to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1)

Chapter 3 of the EIS provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

RES Waste

The Project Owner indicates that most waste generated will be produced during the Project's construction phase. Two types of waste will be produced:

- **Solid waste:**
Construction waste such as wood, piping offcuts, rubble, wires, waste packaging, metals, etc.
Domestic waste or waste similar to domestic waste; plant waste such as remains of shrubs, weeds, and smaller quantities of tree waste removed from work sites.
- **Liquid waste:**
Applicable to the following activities: concrete production, washing and preparation of aggregates, and washing of truck chassis and load beds, machinery, and tools. Other liquid waste relates to wastewater from bathrooms, showers, canteens, and other activities conducted within encampments and site installations.

Gener will place strict contractual requirements on Contractors during the construction phase, aiming to ensure suitable management and final disposal of waste. Additionally, contractors and subcontractors shall agree to comply with regulations and oversight actions established by Law, to be applied to all works of this nature. The planned environmental management manual will prevent the occurrence of any pollution events linked to the Project (**see EIS, Annex 18**).

RSG Risk

The Project Owner possesses a general risk prevention strategy that imposes certain measures on the Project during its different stages of advance. This strategy features the following components:

- a) Measures incorporated into the Project's engineering design.
- b) Systematic verification of compliance with applicable regulations
- c) Establishment of restricted areas
 - c.1) Area restricted due to their archeological, paleontological, or heritage value
 - c.2) Area of natural value that requires protection by the Project
 - c.3) Officially protected area.
- d) Expert supervision during construction
- e) Training regarding environmentally sensitive issues
- f) Internal risk management and accident prevention programs
- g) Separation of works installations and encampments

For further information on each of these points, please see **Chapter 7 of the EIS**, which specifies the **Environmental Management Plan**, the **Risk Control and Prevention Plan** designed for the Project, the safety measures to be adopted in light of the risks identified, and, finally, the **Accident control plan**, to be activated in the event of the failure of the preventive measures taken by the Project Owner. Furthermore, **Annex 32 of the EIS** presents the **Risk and Contingency Prevention Plan** for contractors.

SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

Remark N° 413

3 ENVIRONMENTAL COMPONENT: FLORA AND FAUNA

25. In Annex 23, the Baseline Report on Terrestrial Arthropods Present in the Project Area, which was attached by the Project Owner in response to a request for information on which invertebrate species or populations may be affected by the project, was applicable only to the areas of La Engorda and the Aucayes-Maitenes woodlands - just a small proportion of the project's area of influence. This significantly affects the reliability of the data presented in the study attached in Annex 23.

The same report, in Annex 23, concludes that for the arthropod species in the area, there is a clear lack of information on their host plants or other specific ecological requirements. As was suggested above, in terms of conservation, the area's arthropods should be considered to be insufficiently studied, and the "*butterfly Yramea lathonioides may potentially be vulnerable to damages caused by the implementation of the Alto Maipo project, due to its specificity in habitat ranges and its narrow altitude distribution*".

Thematic responses

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neopteris curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Lilolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopus cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

Remark N° 414

4. WORKS AND INFRASTRUCTURE ASSOCIATED WITH THE PROJECT.

5. PROJECT AREA OF INFLUENCE

28. The Project Owner has introduced substantial changes in the project's planned works, affecting land holdings and land areas that are not included in the area of influence defined in the study. The main changes are the replacement of the layout of the Alfalfal II Tunnel between the Lo Encañado Lake and the drainage basin of the Laguna Negra Lake and the Aucayes Stream, in the Colorado River catchment area; the construction of a forebay, functionally equivalent to the Lo Encañado Lake, in the headwaters of the Aucayes Stream, and the construction of an additional 8 km long road in the Aucayes Stream basin - an area of great plant diversity and Andean sclerophyllous woodland, where the Frangel is the predominant species.
- 5.1.1 The new general layout of the Alfalfal Tunnel (shown on sheet 1) takes it underneath the land holding known as Predio San Francisco de Lagunillas, although the Project Owner does not provide information regarding the environmental conditions of this area of land, or the characteristics of the project works to be implemented there, hydrological and geological characteristics, projected impacts, and environmental or restriction measures. The Project Owner is therefore requested to provide a characterizations of the area, and the project works planned for implementation there.
- 5.1.2 It should be pointed out that the San Francisco de Lagunillas Land Holding, which is to be subject to intervention with the new proposed layout, forms part of the system of Metropolitan Region Priority Biodiversity Conservation Sites, as set forth in the Andean Santiago Action Plan, established in Exempt Resolution N 585 passed in 2005 by COREMA RM. The Project Owner should inform CONAMA of whether it took the protected status of the new area to be subject to intervention into account, and whether it gave sufficiently timely warning to those affected.
- 5.1.3 The new layout passing through the San Francisco de Lagunillas Land Holding passes through the deep gorges of the Peladeros and Piuquencillos mountains, which nourish the headwaters of the Vega Quemada, Calabozo, Rosario, Del Medio, and Las Quinguas Streams, as well as feeding water into the meadows/wetlands of Santa Teresa, Rincón de los Turistas, Pedernalillo, and La Tetona, and the Llanos and Laguna Barrosa wetlands. The Project Owner should provide complete information on this new area of land to be subject to intervention, identifying mountains, creeks, streams, meadows/wetlands, lakes, and the area's hydrological network. The Project Owner should conduct a study to characterize this area of land that will be subject to intervention, specifying the geological and hydrological conditions of the entire area at all depths, as well as the interactions between this hydro-geological unit and the San José Stream, which it feeds into, covering impact on flow rates in the San José Stream - which is a significant tributary of the Maipo River. The Project Owner should include detailed topographic cartography of this area.
- 5.1.4 The proposed layout for the Alfalfal II tunnel will also affect a part of the Hacienda Río Colorado Land Holding. The project Owner should provide a study characterizing the influence of the Alfalfal II Tunnel on the Hacienda Río Colorado, in the upper Aucayes Stream basin, which has been expanded with a further three tunnels (General Layout, sheet 1) not included in previous versions of this project. The Project Owner should include detailed topographic cartography of this area.
- 5.1.5 The Project Owner should also specify the works that the project will implement within this area of influence, in both land holdings: tunnel survey drilling and final excavation along the new layout; how installations will function during project operations; and relationships with the area's geological structure and hydrological network, including interactions with both underground and surface watercourses, and the area's high elevation wetland systems. It should also report the project's expected impacts on soil and subsoil systems and on plants and wildlife in this new area. The Project Owner should incorporate topographic cartography, and include information on the dimensions and depth underground of the works to be built in this area.
- 5.1.6 If geological structures and underground and surface watercourses are to be compromised, directly or indirectly (through structural failure, water seepage or other effects resulting from the construction and operation of the tunnel along this new layout) the Project Owner should include proposed prevention and mitigation measures to protect the meadows/wetlands and streams located in both of these land areas, and to maintain the normal dynamics of the hydrological networks present.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the

project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03.03 Underground water

Underground water will not be affected in any way by the operation of the Project. This is the case because the underground water flow capacity in each sector of the aquifer associated with the Maipo River is much lower than the minimum flow running through each

section of the river, and therefore under all circumstances the aquifers shall remain saturated. Thus, underground water sources present in the area shall also not be affected.

The PHAM plans to construct 70 km of tunnels, of which approximately 50 km correspond to headworks or hydraulic pressure tunnels, the remainder being access tunnels for use during construction of the project and for subsequent operation of the power plants (see **EIS Chapter 5, Section 5.3.5.3**).

Most of these tunnels have been designed to operate at variable internal pressures, with a maximum achieved at certain points of a little more than 450 m. The design requirement for these tunnels is that the lower limit of principal compression in the surrounding rock medium is always less than the operating pressure, such as to maintain a sufficient safety margin to prevent alterations in natural permeability dynamics through hidrojacking. In areas where this design principle is not guaranteed, the Project plans to install impermeable tunnel linings (**EIS, Annex 45.4**).

During the excavation of these tunnels, it is possible that the work front may have to pass through permeable rock strata - leading to seepages of water into the tunnel, the magnitude of which will depend on the permeability of the rock, the depth of the tunnel, and the level of the water table. In some areas, tunnel wall treatments may have to be applied in order to prevent water transfer into or out of the headworks tunnels.

The Project does not plan to make use of any water seepages that may arise, in the generation of electricity. Additionally, the overarching design principles underpinning the Project are oriented towards limiting seepages during construction, in order to establish suitable conditions for efficient tunnel excavation activities. The same principle applies to methods to limit the infiltration of water from the tunnels into the rock mass, thus avoiding water loss during operations.

Additionally, these procedures guarantee that any groundwater that may intercept the tunnels shall suffer no change in its natural hydrological dynamics, or impact on any foreign components or water other than the water entering the system (**EIS, Annex 45**). Special attention will be paid to the quality and characteristics of any water that may eventually return to the natural water system through the tunnel access windows, and therefore construction contracts will specify measurements that must be made and the treatment that shall be required for subsequent disposal of such water, in order to ensure compliance with the quality requirements for water discharge into natural watercourses, under regulations currently in force.

In the event of seepages of water at high temperature and possible acidic composition, it is important to make clear that in general there shall be no major differences in the methods used to render the tunnel walls impermeable. During all site surveys conducted, research boreholes and surface geological maps produced to date applying to the areas through which the tunnels will pass, no evidence whatsoever has been found to lead to any prediction of the presence of water at high temperatures, or with mineral or acidic contamination. As additional background information, during the construction of the Alfalfal Plant - with the excavation of 35 km of tunnels - no events similar to those indicated above occurred. Notwithstanding the above, the specification establish that, in locations located close to potentially critical areas, the contractor must drill survey boreholes of between 25 m and 30 m in length ahead of the tunnel work front, in order to gain early warning of seepage problems and thus be able to apply impermeable tunnel wall treatments as required. See **EIS, Annex 45.4**.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles,

70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of

species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3**, and **Addendum 1, Annex 17**). With regard to amphibian species facing conservation

concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neopteris curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo Spinolosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Lilolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

Remark N° 415

11. BASELINE

30. The baseline for water in the El Manzano Channel is absolutely invalid, as this plan should be presented to and signed by the owner of the property to be subject to intervention - in this case, the Ministry of Public Goods.
The reduction in areas with a high density of Frangel trees - a vulnerable species of high biological value - is once again in clear contravention of the requirements set forth in the Regional Biodiversity Conservation Strategy and the Andean Santiago Action Plan, where this species is listed as a priority species for conservation. This situation also applies to the Guayacán, as more than 500 specimens of this species are to be felled. The Project Owner is requested to clarify the situation and the presentation of the Felling Management and Reforestation Plan to CONAF, and to explain how the Ministry of Public Goods has agreed to sign this management plan.
35. Vegetation Restoration Plan. The company asserts that it will use the ecological succession process in recovering the woody species covered in Annex 17. It should also be made clear, "that the Vegetation Restoration Plan is not a compensation measure applicable to individual plant specimens extracted, but rather shall be implemented rigorously in the sites subject to intervention where a possibility of recovery exists, with the principle objective of stabilizing land after construction activities and, inasmuch as is possible, reconstructing previously existing vegetation in order to control erosion, mitigate visual impact, and restore animal habitats".
As the process of Ecological Success consist of "changes that take place over tens, hundreds, or thousands of years, and that stands above shorter time scale fluctuations and cycles; succession is a phenomenon of progressive occupation of areas" (<http://tar5.eup.us.es/master/ponencias/moduI06/sucesion.pdf>), the methodology proposed by AES Gener implies:
Systematically and deliberately ignoring the requirements of the Chilean State regarding environmental mitigation.
Leaving the effects of project works on properties to nature's capacity to regenerate, and to the knock-on effects of any other type of fluctuation in the ecosystem, be it physical/chemical, chemical, microbiological, or biological. In this case, only the maintenance of these conditions, with no alterations whatsoever, can permit the occurrence of the phenomenon of ecological succession. It shall be practically impossible to guarantee such conditions, taking into account the level of human activity required by the PHAM - as is recognized by the company: "Considering that in most cases the substrate to be left at the site shall not be the same as that from which the specimens were extracted".
It therefore cannot be expected that the phenomenon of ecological succession will occur, for the recovery of the 40 species that will be extracted from their habitat, as the soil into which they will be replanted shall not be the same, and as the environmental stress to which they will be subjected on-site over a period of three or more years shall render the maintenance of the environmental equilibria necessary for the phenomenon of ecological succession impossible. This means that the sites will remain as wasteland, not only for centuries (as would be normal for ecological succession) but rather forever.

Thematic responses

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neopteris curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS**,

Chapter 7, Annex 7 and Annex 29).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo Spinolosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Lilolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

F&F.02.02 Mitigation

Aquatic flora and fauna

The Project calls for a suite of multi-purpose environmental management measures that aim to minimize its effects on living organisms, including: minimization of watercourse areas to be subject to intervention by prioritizing such works for late summer and early fall seasons (period of lowest flow rates), the adoption of special precautions to prevent accidental spillages into watercourses (prohibition of the storage of lubricant drums in or near watercourses, etc), and permanent maintenance of ecological flow rates.

For more detailed information, including technical documentation that complements the information described above, see Annex 17 of the Addendum.

Terrestrial Flora and Vegetation

In order to prevent and/or minimize the Project's effects on plant life, it plans to adopt a number of integrative measures: micro-routing in advance of starting work on-site, in order to identify specimens of plants listed in any conservation category and subject to impact; compensation with the planting of 10 specimens for every one destroyed, in the case of non-woodland species listed for conservation; implementation of a woodland management plan applicable to woodland areas, which describes its measures in accordance with Article 5 of the Woodland Law; implementation of vegetation restoration plans at muck disposal sites, encampments, artificial slopes, and tunnel access terraces (EIS, Annexes 7 and 29). More in-depth information on complementary measures is provided in Annex 6 of Addendum 1.

Terrestrial fauna

Specific wildlife environmental management measures have been proposed for each particular species, taking into account prior experience in the success of these measures in similar projects. These measures will be implemented in continual coordination with the Servicio Agrícola y Ganadero. Principal measures include: capture of individuals belonging to species of conservation interest for rescue and relocation; controlled perturbation actions; and habitat replacement.

Other measures are based on the use of signage, training for Contractors, and contractual requirements for on-site supervision (see details in Section 6.4.1.6 of the EIS).

See Annex 4 of the Addendum for the native wildlife rescue and relocation plan.

Remark N° 416

v. IMPACT EVALUATION AND ENVIRONMENTAL MANAGEMENT MEASURES

36. The Project Owner states that the project will lead to a traffic increase of only 19 buses, 29 trucks, and 14 light vehicles on Route G-25. However, it is also indicated that the PHAM plans call for the creation of 5 encampments, located away from settlements each housing a permanent contingent of 200 employees, under the standard working regime adopted by mining installations.

The transport of employees from the encampments to their places of residence shall have a frequency determined in accordance with the working shifts (11/4 or 10/5 days working/resting. See Annex 29 of Addendum 1). Therefore, it is important to understand that under no circumstances shall the presence of Project employees in the area lead to the type of interaction with The resident community and demand for local services that currently occurs as a result of the flow of tourists and visitors, mainly during weekends, holidays, and the summer season. Calculations of the number of workers passing through the district simultaneously for each shift result in estimates of 1000 persons - with a maximum of 40 passengers per bus, this results in a figure of 25 buses, as against the 19 reported in Table 26. The Project Owner is requested to explain whether it is its calculation of vehicle impact on Route G-25, or its figures for the number of workers passing through the district at any one time, that is incorrect.

Thematic responses

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.02 EIS Additional and Complementary Information

In accordance with consultation procedures conducted by oversight services, further studies and information have been incorporated into Addendum 1, which complements existing information provided in the EIS. Regarding ecological flow rates (**Annex 17**), cultural heritage (**Annex 14**) and the management of summer grazing areas (**Annex 6**).

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

PRO.03.03 Encampments and Works Installations

For details on the creation of encampments and works installations, please see Chapter 2, Section 2.3.2.4 in the EIS.

For information on PHAM encampment and work site approach routes, see EIS, Chapter 2, Table 2.1.2,

For information on regulations, see Chapter 3 of the EIS and Annex 33, General Operating Regulations for Encampments and Work

Sites.

For information on the management of waste produced at work sites and encampments, see Annex 18 of the EIS, "Site Installation Waste Management Plan".

For information on the discharge of treated wastewater, see Response 26 in the Addendum.

For information on human consumption of water at encampments and works installations, see Chapter 2, Section 2.3.2.4, parts b and i.

For an assessments of the impact of the creation of encampments and works installations, monitoring methods, and conditions, see Chapter 6 of the EIS.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.02 Human contingent presence

The presence of Project employees will be temporary (limited both to the years of the construction phase, and to the working day organized into shifts), thus disincentivizing them and their families from moving to the area on a permanent basis. During the Project's construction phase, its employees shall sleep in the encampments described in the documentation, not making use of existing hotels and hostels located in and near the area's settlements.

Once the construction phase has been completed, the Project's installations and encampments shall be removed; they shall therefore not become part of existing settlements, or form new centers for the formation of settlements.

The PHAM plans call for the creation of 5 encampments, located away from settlements. These encampments will be operated as described in Annex 33, and each will house a permanent contingent of 200-400 employees, under the standard working regime adopted by mining installations. The transport of employees from the encampments to their places of residence shall have a frequency determined in accordance with the working shifts. Therefore, it is important to understand that under no circumstances shall the presence of Project employees in the area lead to the type of interaction with The resident community and demand for local services that currently occurs as a result of the flow of tourists and visitors, mainly during weekends, holidays, and the summer season.

In view of the above, the Project shall not lead to the following potential impacts: overpopulation at a local or district level (in existing settlements); or effects modifying local customs, economic service provision activities, connectivity, and local load capacity (understood to refer to the load placed on infrastructure and equipment).

As indicated in Annex 39 of the EIS, documentation supporting the analysis described above shall form part of activities under the Social Indicator Monitoring (SIM) program. This monitoring program is based on compiling information using qualitative and quantitative techniques developed in the field of Social Sciences, oriented towards investigating a suite of indices that pay due heed to trends in relevant variables for monitoring, selected in accordance with the characteristics of the Project and of the communities in the area where it is to be implemented. Reports will be issued twice per year containing the results obtained, including the use of graphical aids to show comparative changes in parameters from one study campaign to the next. This document will be delivered to CONAMA.

In general, by gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project may cause in its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities.

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**.

The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.03 Congestion

When PHAM Project construction activities begin, there will be an increase in road traffic movements in the immediate surroundings of the work area. This vehicle movement will be related mainly to the transport of supplies and machinery to the works installations, transport of excavation spoil to muck deposition sites, and, to a lesser extent, the transport of personnel to the work sites. For more information on traffic flow increases resulting from the Project, see **Chapter 2, section 2.4.1, part E, Annex 14 of the EIS, and Annexes 9 and 14 of Addendum 1**.

The PHAM highway impact analysis takes into account all works and activities under the Project, including the transport of supplies, machinery, and personnel. According to modeling studies conducted, it is predicted that there will be no significant impact on highway usage (levels of

of new and existing roads and intersections). For more information on the Project's road operations, measurements used and models derived, see **Annexes 9 and 15 of the Addendum**. Additionally, increases in noise emissions are analyzed in **Section 6.4.1.2 of the EIS**.

Notwithstanding the above, it is assumed that, given that certain construction activities shall be conducted at the same times that other road users wish to make use of certain sections of specific roads, a certain level of annoyance may be caused, and for this reason the PHAM has adopted a number of control and mitigation measures indicated in **Chapters 6 and 2 of the EIS** and in **Annex 14 of the EIS**, as well as **Annexes 9 and 17 of Addendum 1**.

It is considered likely that, in view of the predominance of the tourist industry in the local economy of the district of the Maipo Valley, a certain level of annoyance may be caused at certain points and at specific moments, mainly due to conflicts between PHAM road usage and the movements of visitors. As indicated in the EIS Baseline Study, this is an area where tourists come to enjoy walks and peace and quiet, on weekends and holidays. In particular, there are 2 specific tourism attractions located in the same areas as site installations: The El Yeso and the Alto Volcán area, where special measures shall be taken, as specified in **Chapter 6 of the Project EIS**.

Additionally, **Annex 32 of the EIS** specifies emergency procedures to be adopted in the event of transport accidents caused by project vehicles.

Remark N° 417

v. IMPACT EVALUATION AND ENVIRONMENTAL MANAGEMENT MEASURES

37. Human and Social Environment The company presents an ethnographic study that makes a number of generalizations based on interviews made with key focus group members in the community. However, the study exhibits features that are utterly outlandish for a study of this kind, as it ignores the diversity currently present in the area known as the Cajón del Maipo. The decision to raise the profile to the livestock industry to make it appear to the main activity conducted by members of the most traditional families serves to conceal thousands of persons currently working in other sectors such as tourism, trade, etc. The Project Owner must present a serious and unbiased study addressing all social and economic productive activities undertaken in the Maipo Valley areas, that would be directly or indirectly affected by the project. The EIS includes a large number of deeply debatable reductionist statements regarding the manner in which the relationship with the place that persons have chosen to live in is managed and founded, forming a conscious part of the life decisions and plans of thousands of individuals. For example: "Traditional residents see the mountains as a living entity, of the female gender, with its own will, that can benefit or destroy people; however, for new residents, the mountains mainly represent esthetic, sporting, and/or ecological assets". Tourism: From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc. The Project Owner is requested to present a cartographic survey of tourism activities that will be affected by works as the Annexes make no mention of the bouldering areas in the Cajón del Arenas, or the roads running from Engorda to the Marmolejo and Volcán San José mountains, which will be affected by project works, and similarly no information is provided regarding the El Morado Lake; these areas are visited by a significant number of tourists, including foreign visitors and Santiago residents, located in the Area of National Tourism Interest and, as stipulated by decree by this district, and which results in an obligation to evaluate all activities that plan to cause "Significant alteration, in terms of magnitude or duration, of the tourism or landscape value of an area", as stipulated in Article 30 of the Environmental Base Law. In view of the above, the Project Owner is requested to provide "a precise definition of the area's value for tourism, and its current or potential vulnerability".

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel

will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfafal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **CAL.05 Promoting entrepreneurship**

The company has agreed to use its **Fundación Maitenes** foundation to set aside an **annual fund over a 10 year period starting in 2010**, to support local residents who formulate tourism development business plans for implementation in the area. These projects will be financed through funds open for competitive tenders; submissions will be evaluated on their own merit by a council of community representatives, which will select which projects will be funded.

The initiative to be implemented by the Fundación Maitenes may be linked to projects in progress run by public institutions and services in the district, related to the two lines of action that the foundation has agreed to support. This linkage may help to strengthen state-run initiatives and foster sustainability over the course of time for the actions supported by the foundation, during the period in which the program is active.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.01 River sports

During the operations phase, the activities of the PHAM shall not directly or indirectly interfere with tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. Furthermore, the PHAM shall have no significant effect on boating activities on the Maipo River as a result of reductions in river flow rate; an analysis is presented in Annex 17 of the Addendum modeling a number of hydrological scenarios (1), concluding that the PHAM shall not affect the current situation in rafting and kayaking activities conducted in the area between San Gabriel and San José de Maipo.

In order to establish an analysis comparing the current Maipo River boating situation with predictions for the situation with the Project operational, the variables of flow rate, river width, and water depth were modeled, as valid indices to establish conditions for boating activities on the Maipo River.

This analysis showed that the Project shall not interfere with tourism activities conducted on the Maipo River, in view of estimates that in a dry year, the magnitude of variations in flow rate and water depth will not cause interference with boating activities.

For more information, see **Annex 17 of Addendum 1**.

- (1) The hydrological analysis used to evaluate reductions in flow rate is based on a statistical record going back 50 years, thus ensuring that seasonal and annual variations are incorporated into the analyses conducted.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**.

The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayas, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions. The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures,

see

Chapter 2, point 2.3.2.5 of the EIS.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, roadworks, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

Remark N° 418

Summary of Remarks on the Human and Social Environment: 38.POWERS OR PROHIBITIONS OF THE MUNICIPAL GOVERNMENT REGARDING THE GRANTING OF THE PERMIT

1. Article 5 of Decree with Force of Law 458, regarding the General Law on Urban Development and Construction, states that it shall be the task of the Municipal Governments to apply this law, the General Ordinance, the Technical Regulations and other Regulations, in their administrative actions related to urban planning, urban development, and construction, with it being their duty in all cases to ensure compliance with said dispensations. Article 23 of the same Decree states that: Failure to comply with the obligations set forth in this law shall constitute grounds for the removal of a Mayor. Land use for areas not included in a Master Plan may not be modified, inasmuch as the existing quantity of construction on such land may not be increased, existing installations may not be rebuilt, and permits may not be granted to a new owner or lessor.
2. As stipulated in Article 1 of Decree with Force of Law 458, regarding the General Law on Urban Development and Construction, the dispensations contained therein relating to urban planning, urban development, and construction, as well as the dispositions of the Ordinances set forth in said fields, shall hold force throughout the national territory. Article 7 adds that the dispensations shall prevail over any other stipulation in the same field, and that the dispensations of other laws that may have been contrary thereto are to be considered to have been revoked. Article 58 states that the granting of municipal permits shall be in line with land zoning, and that permits not covered in any special regulations shall be subject to an opinion in favor issued by the Department of Municipal Works. Article 61 stipulates that changes in zoning shall be processed as modifications to the applicable Master Plan. Article 126 stipulates that construction permits shall be granted following the payment of applicable municipal fees.
3. Therefore, and for the reasons specified above, the project does not fully comply with the requirements established in the Municipal Revenue Law for the Alto Maipo Project Owner to obtain a municipal permit on request; similarly, the project does not comply with the zoning requirements specified in Decree with Force of Law 458, General Law on Urban Development and Construction, or with the Santiago Metropolitan Master Plan.
4. In view of these clarifications, it would not be acceptable to maintain that, as a result of having been authorized by COREMA - the environmental authority - the project would be in any way absolved of its requirements to obtain further permits or authorizations that can be demanded in order to undertake any economic activity. Indeed, as resolved in the judgment on Economic Amparo Appeal N° 2183-2002 heard at the Supreme Court, "an appropriate municipal permit is a requirement, as is the payment of a corresponding fee or fees, if the project features locations in a number of districts. As in the case of ancillary judgments, if construction works must be implemented then the authorization of the applicable Department of Municipal Works is necessary. No exemptions are possible relieving a party from compliance with these legal requirements, which are established in accordance with the activity to be conducted - this applies to authorizations that must be obtained from environmental authorities, and authorities with remits covering laws on municipal revenue and urban development. With regard to the above, it should be made clear that these findings apply to permits for works necessary for the solid domestic waste treatment plant to function adequately, and permits for the subsequent operation of this plant.

Thematic responses

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly

frequented, minimizing their visual impact.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1)

Chapter 3 of the EIS provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

Remark N° 419

VI. ENVIRONMENTAL MONITORING AND MANAGEMENT PLAN

39. Ordinance NQ 82/74 and the Santiago Metropolitan Master Plan (8.3.1.1) indicate that the Project Owner must ensure the restoration of the landscape in all areas that will be subject to intervention. In Annex 17 of Addendum 2, the Project Owner proposes leaving "landscape restoration in all areas to be subject to intervention" to the phenomenon of ecological succession, which operates over time scales ranging from 7 years (merely to begin) through to 1000 years for medium height trees. Additionally, in the same response the Project Owner states that the original soil of areas subject to intervention will be replaced. This will delay the process of primary ecological succession as a result of the manner in which the Project Owner will implement the soil exchange procedure, as indicated in Annex 17 of Addendum 2.
40. It is our understanding that inasmuch as the Project Owner "should account for a botanic evaluation of the use of bischofite with and without the project", the authorities are referring to two studies, and not to one, as planned in the micro-routing study. Additionally, the mere fact of conducting a study after intervention in the areas affects renders it impossible to generate data for comparison. This would imply the implementation of the action without taking into account necessary and applicable baselines. An official or academic source is required if the evidence provided regarding the use of bischofite is to be accepted.
41. The Project Owner does not plan to install meteorological stations, running the risk of lacking baseline measurements; while the aforementioned study "Climatic Variations in Chile for the 21st Century" indicates that the Maipo River Basin is at risk of drought during the first third of the 21st century. The authorities are requested to include the latest scientific findings in this field.

Thematic responses

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03.05 Abandonment plan/Destination of post- works constructions

Gener has specified a complete and rigorous program for the closure and removal from the area of temporary installations, and subsequent cleaning and/or restoration of areas occupied on a temporary basis.

The installations that will be used during the construction phase and subsequently removed or dismantled will be the encampments, site installations, and platforms installed on a temporary basis for access at work sites and for the placement of other, smaller installations.

The entire areas occupied by encampments and site installations shall be restored, while at tunnel exits/entrances an access road and a small work space (approximately 400 m²) must be left at the site for minor auxiliary installations.

Abandonment of works: given that most of the works/installations to be created under the PHAM will be temporary (encampments and site installations, during the construction phase), in this regard attention is paid only to the muck disposal heaps, which shall be built using the application of carefully designed and selected techniques to prevent the possibility of landslides and landslips when they are abandoned. The muck disposal heaps will be built up in an organized manner, forming level and safe platforms, with slopes at the sides with the natural gradient formed by the material in question, thus ensuring stability. Finally, the muck disposal

heap will be covered over with topsoil (extracted previously from the same site), and this surface shall then be restored with natural plant coverage in low altitude areas, thus permitting the final closure of the muck disposal heap.

Project closure and restoration activities for the areas used on a temporary base shall be included as contractual requirements demanded of contractors. For detailed information see the EIS, Annexes 6 and 29.

SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

SUE.01 Regulations

The Project Owner is subject to the following regulations, which are specified in detail in Chapter 5 of the EIS, Section 5.7.2.1, regarding the Santiago Metropolitan Master Plan.

With regard to planning instruments, the PHAM is to be implemented in the district of San José de Maipo, which does not have a District Master Plan (one is currently being prepared), and which only has current urban limits for the settlements of San Alfonso, La Obra, San José de Maipo, El Melocotón, San Gabriel, and Las Vertientes. Conversely, the Santiago Metropolitan Master Plan (PRMS) establishes a number of land use regulations that apply to the project area, most of which are related to ecological preservation and/or protection and risks. Most of the district's surface area is classed as Ecological Preservation Area, which aims to maintain a zone's natural state, in order to preserve and contribute to the environment's quality and equilibrium, as well as to preserve landscape heritage (see further information in the conclusions stemming from analysis of regulations, in Section 5.7.3, Chapter 5 of the EIS).

Supreme Decree 366 (Exploitation of Tamarugo, Carob, Chañar, Guayacán, Aextoxicon, Charcoal, Acacia, Boldo, Maiten, Litre, Bollen, and Quillay). This legal instrument governs the felling of trees and bushes.

Supreme Decree 4363 and D.L 701 (Approving the Definitive Text of the Law on Woodland and Regulations on Forest Promotion).

Article 2 of the Woodland Law establishes an obligation that land classified as for preferential woodland land use, as well as natural and artificial woodlands, are subject to woodland management plans approved by the National Forestry Commission (CONAF). Furthermore, Article 21 of Decree Law 701 establishes that any felling or usage of native woodland shall be subject to the CONAF's prior approval of the corresponding management plan.

Decree 82 (Prohibiting the Felling of Trees and Bushes in Indicated Andean High Mountain and Foothill Areas)

Article 102 Sector Environmental Permit (Permit for the felling or exploitation of native woodland, in any type of land, or plantations located in land with preferential characteristics for woodland use).

For further information and analysis on the aforementioned regulations and permits, as applicable to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see Sections 3.2.6 and 3.3.7 in Chapter 3 of the EIS.

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**.

The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.04 Damage to roads and trails

The level of intervention to be generated by the Project was determined based on levels of saturation and deterioration of service levels, arising as a result of vehicle traffic caused by the Project - this Project highway impact analysis therefore did not take into account wear and tear on the road surface, as this parameter is not relevant when truck traffic complies with weight limits established by the Ministry of Public Works' Highways Department. In this regard, the Project Owner will permanently supervise weight control, in order to ensure compliance with the stipulations made in Ministry Public Works Supreme Decree 158/1980 which establishes gross weight limits for highways, as well as Decree 200, dated July 1993 and Decree 396, dated November 1993, establishing gross weight limits for urban streets. In both cases vehicle weight may not exceed 45 tons. For more information on measures planned by the Project Owner to ensure compliance with these regulations, see specific information in **Chapter 3 of the EIS**.

Furthermore, the Project Owner plans to undertake the conservation of Route G-25 (El Volcán area) and Route G-455 to the El Yeso Reservoir. Details of the current condition of each of these routes and planned road conservation measures, see the Road Improvement Program, in **Annex 19** of the EIS.

Finally, in advance of the start of road conservation activities, the corresponding Projects were approved by the Santiago Metropolitan Region Regional Highways Department.

With regard to areas of interest for tourism, the

Remarks and Responses

Remark N° 419 Page 3

conservation of part of the highway network and year-round maintenance of the more remote stretches of Route G-455 to El Yeso and Route G-25 from El Yeso Bridge to the El Volcán area will improve accessibility, favoring an increase in influx of visitors or the arrival of visitors over lengthier periods of the year, as these areas are largely inaccessible to tourists for a significant part of the winter season.

Remark N° 420**VII. OTHER CONSIDERATIONS**

43. The Project Owner is requested to submit a copy of the following documents on Natural and Cultural Heritage to this Municipal Government:

- a) location of the area surveyed
- b) total surface area surveyed
- c) geographical description of the area, in terms of topography, vegetation, and modifications of human origin (include photographs)
- d) paleontological and geological background information
- e) survey methods and techniques
- f) measures for the protection or preservation of existing paleontological heritage in the project's area of influence.

It is not sufficient for this information to be submitted to the Chilean Paleontological Society (SPACH), as these sites of paleontological heritage are located within the district, and constitute a conservation priority as cultural heritage of San José de Maipo - particularly considering that the SPACH is an association with no legal power regarding finds of this type, as stated in Law 17,288, passed by the Ministry of Public Education and amended by Law 20,021 dated 14.06.2005, which empowers the Chilean State - and, representing the state, the National Monuments Council - to take all actions regarding the management of this type of heritage. Therefore, any permit, agreement, or management plan must be submitted to this institution, and in this case the SPACH has no legal powers over such sites.

The following remarks are issued with regard to the statements made in Annex 36, PROPOSAL FOR COMPLEMENTARY STUDIES ADDING TO THE BASELINE AND MANAGEMENT MEASURES FOR PALEONTOLOGICAL ISSUES IN THE ALTO VOLCÁN AREA (VALLE DEL ARENAS):

Thematic responses**ARQ Archeological and
Paleontological Sites: Heritage**

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

Remark N° 421

4 PROPOSAL FOR COMPLEMENTARY STUDIES ADDING TO THE BASELINE

Paleontological survey.

Following approval by the National Monuments Council, the first phase of the survey would consist of identifying areas of paleontological-sedimentological interest, by conducting a topographic survey.

The law establishes that FOSSILS AND THE SITES WHERE THEY ARE LOCATED ARE A NATIONAL MONUMENT without specifying differences between paleontological pieces depending on their importance to science.

In this regard, there is a need to identify how criteria will be established for the classification of pieces according to their scientific significance, the institutions or persons who shall act as guarantors, and the legal backing for conducting surveys of the quality described - as these are actions that infringe legislations in force. Intervention at fossil sites implies the loss of material that no known mitigation measure can resolve. The extraction of a part of the material that is visible causes the loss of many other parts that remain covered. The removal of pieces and their deposition in other areas takes them out of their original context and leaves them stripped of all scientific value. It is fundamental that the Project Owner's published baseline should include the sites of unique scientific value described in Point 24 (geological and paleontological sites). In this regard, the Project Owner must specify what measures it shall implement if it does not possess permits issued by the National Monuments Council, for how long it shall support these measures, and what institution(s) will vouch for them.

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

ARQ.03 Scientific research

The scientific and cultural importance of the paleontological resources present has been recognized by the PHAM Project Owner, leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the Project Owner has taken on a commitment to enhance knowledge of the area before starting planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may be detected during the course of construction under the PHAM. These activities will contribute not only to the maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of materials or components present.

For more information, see **Annex 14 of Addendum 1**.

Remark N° 422

5 PROPOSED MANAGEMENT MEASURES

- i) Recovery and/or relocation of paleontological finds.
"Based on the results of the paleontological survey, and subject to approval by the National Monuments Council, the PHAM shall relocated material at risk of being affected by the Project to a nearby area not subject to intervention under the Project, or to a museum or accredited institution, depending on the type of material and the statement issued by the Monuments Council".
 With reference to the management measures described in point i), it is important to establish that in view of the nature of paleontological finds (unlike archeological pieces, which, being the work of humankind, are finite and can be addressed "on human terms"), fossils are found in deposits that may measure kilometers across. The scale of this task therefore renders it very difficult or impossible to complete.
 The Project Owner is therefore requested to specify the methodology that will be applied for these surveys, and to provide suitable evidence for the feasibility of this approach.

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

ARQ.01 Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum 1**.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material
- b) creation of a viewpoint
- c) fossil trail

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

ARQ.03 Scientific research

the scientific and cultural importance of the paleontological resources present has been recognized by the PHAM Project Owner,

leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the Project Owner has taken on a commitment to enhance knowledge of the area before starting planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may be detected during the course of construction under the PHAM. These activities will contribute not only to the maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of materials or components present.

For more information, see **Annex 14** of **Addendum 1**.

Remark N° 423

OTHER COMMITMENTS ACCEPTED BY AES Gener.

44. REMARK REGARDING TOURISM

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the short, medium, and long term.

Table 1 shows an extrapolation of the tourism sector in the district. Study background: "Sources of Employment in the District and Sustainability Conditions" (2008. CGP Consultores).

This evidence shows that, following a simple extrapolation of growth in the district, the temporary jobs that the project will generate during the years of project construction will mostly be lost as a result of the impact on the tourism industry arising from reduction in river flow rates to 10% of their current values.

In view of the above, the Project Owner is once again requested to provide the information requested in Remark 37, regarding "a precise definition of the area's value for tourism, and its current or potential vulnerability".

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plant (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the execution of works that bring more dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members

to work in the district.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **SOC Socio-Economic Impact**

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.01 Jobs in the District

Local labor availability is estimated based on figures from the Labor Brokerage and Information Office. This information will be made available to construction contractors so that they can preferentially hire local workers. According to information compiled at the Project Office in San José de Maipo, the project has registered a total of 980 potential project workers, of whom 390 are unemployed, broken down as follows:

Mine workers:	105
Carpenters, Builders, and Rebar Layers:	157
Heavy Machinery Operators:	131
Non-specialized day laborers:	39
Drivers:	87
Specialized technical personnel:	60
Welders:	26
Foremen and supervisors:	7
Graduate professionals:	20
Cleaning, security, and canteen workers:	120
Administrative personnel:	91
Other, misc.:	139

The average project workforce during the construction phase (5 years) is estimated at 2000 persons, and during the Citizen Participation process the company has agreed to ensure that an average of at least 500 local persons will be on the payroll during the construction of the Project.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. In parallel, the study investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the

district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02

Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 424

OTHER COMMITMENTS ACCEPTED BY AES Gener.

47. CHANGES IN LOCAL CUSTOMS AND LAND USE

As has already been stated, the company should present a more rigorous ethnographic study that takes account of the population's cultural diversity, and specifies how this will be affected. By concentrating on a single group, the study omits, overlooks, or under-represents the project's impact on other social groups.

The Project Owner should present a serious and unbiased study addressing all social and economic productive activities undertaken in the Maipo Valley areas, that would be directly or indirectly affected by the project.

Information is requested regarding the potential effects that may occur regarding the different highway improvement initiatives for routes used by persons engaged in the livestock industry in the area, and impacts during the construction of new roads. The Project Owner is requested to define the necessary mitigation, reparation, and/or compensation measures. For example, road improvement activities may be conducted during the season that these roads are not used for livestock herding.

The Project Owner does not address the mitigation, reparation, and/or compensation measures necessary to address potential employment impacts for the roads created or improved under the project; it merely proposes sporadic supervision of the situation. In concrete terms, this means that it will only respond to specific conflict situations, and will not generate a schema for the works that clearly specifies livestock herding cycles and movements, so as to implement an operational design that takes this variable into account. The Project Owner is requested to design a monitoring plan that will allow the evaluation of changes in livestock herding dynamics during the period when construction works are implemented.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and accessibility, thus increasing the value of the surroundings and

property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;

- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. In parallel, the study investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayas, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions. The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS**.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly

to the following factors:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, roadworks, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

VIA.04 Damage to roads and trails

The level of intervention to be generated by the Project was determined based on levels of saturation and deterioration of service levels, arising as a result of vehicle traffic caused by the Project - this Project highway impact analysis therefore did not take into account wear and tear on the road surface, as this parameter is not relevant when truck traffic complies with weight limits established by the Ministry of Public Works' Highways Department. In this regard, the Project Owner will permanently supervise weight control, in order to ensure compliance with the stipulations made in Ministry Public Works Supreme Decree 158/1980 which establishes gross weight limits for highways, as well as Decree 200, dated July 1993 and Decree 396, dated November 1993, establishing gross weight limits for urban streets. In both cases vehicle weight may not exceed 45 tons. For more information on measures planned by the Project Owner to ensure compliance with these regulations, see specific information in **Chapter 3 of the EIS.**

Furthermore, the Project Owner plans to undertake the conservation of Route G-25 (El Volcán area) and Route G-455 to the El Yeso Reservoir. Details of the current condition of each of these routes and planned road conservation measures, see the Road Improvement Program, in **Annex 19** of the EIS.

Finally, in advance of the start of road conservation activities, the corresponding Projects were approved by the Santiago Metropolitan Region Regional Highways Department. With regard to areas of interest for tourism, the conservation of part of the highway network and year-round maintenance of the more remote stretches of Route G-455 to El Yeso and Route G-25 from El Yeso Bridge to the El Volcán area will improve accessibility, favoring an increase in influx of visitors or the arrival of visitors over lengthier periods of the year, as these areas are largely inaccessible to tourists for a significant part of the winter season.

Remark N° 425

ADDITIONAL REQUESTS

- a) As in the case of the questions raised regarding the El Morado Natural Monument in Addendum 2, (point 1.1.24), the Project Owner is requested to report whether the new tunnel layout passing underneath the San Francisco de Lagunillas Land Holding, and its trifurcation at the Hacienda Río Colorado, does not imply the creation of new works such as road-building, tunnel openings, or other surface installations - during the project's construction or operations phases - thus requiring the entry of personnel and machinery into this area. The General Layout Plan shows no new openings in the Alfalfal II tunnel as it passes under the San Francisco de Lagunillas Holding; but it does indicate an opening in the Hacienda Río Colorado Holding.
 - b) The Project Owner is requested to provide information on the site study, exploratory boreholes, surface maps, and hydrological and geological studies conducted at the land holdings known as Hoya Laguna Negra Lake and San Nicolás Stream, Hijueta Lot 3, Hoya Embalse el Yeso, San Francisco de Lagunillas, and Hacienda Río Colorado to determine a land use baseline and the geophysical and hydrological characteristics of the areas where the Project Owner will conduct the new works that are included in Addenda 1 and 2. The Project Owner has changed the tunnel layouts, but has not evaluated the environmental impacts of these changes. Conservation issues serve to determine higher ecological flow rates.
 - e) The Project Owner is requested to specify the longitudinal profile, depressions, and elevations (depth of the line to be taken by the new Alfalfal II Tunnel under the altitude of peaks and gullies) in the areas of the headwaters of the Vega Quemada, Calabozo, Rosario, Del Medio, and Pedernalillo Streams, in the Peladeros, La Tetona, and Piuquencillos Basins, and in the San Francisco de Lagunillas Land Holding, in order to identify the distance between the tunnel and the network comprising the area's hydro-geology and wetlands.
 - e) The Project Owner is requested to specify the longitudinal profile, depressions, and elevations (depth of the line to be taken by the new Alfalfal II Tunnel under the altitude of peaks and gullies) in the areas of the Piuquencillos and Tórtolas mountains in the Hacienda Río Colorado area, and the streams that flow into the El Sauce and Aucayes Streams and the area's high altitude meadows and wetlands.
- Finally, the Project Owner is requested to include the planned layout of the power transmission lines, which were omitted in the previous EIS. Although a process was conducted for consultation with the community and state services (Icsara), the company has made no statements regarding its duty - ignoring a number of issues, including the consequent impact on the landscape of an area with major tourism interest.

Thematic responses

Specific response

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of the power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

ELE Electrical Installations

The electrical installations presented in the EIS comprise the substation, to be located in the El Sauce area, the characteristics of which are to be found in **Annex 27 of the EIS**; given that the electricity transport layout (cabling and towers) is to be presented to the Environmental Impact Assessment System once all background information is available.

ELE.03 Transmission lines

In view of the project's location, close to Santiago, it is expected that the distance covered by the definitive cabling layout will be short, involving a minimum of sectors not subject to prior intervention. With regard to the specific location of the cabling layout, plans call for the use of the existing high tension power line used by the Queltehues, Volcán, and Maitenes Plants.

Once the layout of the high tension power line has been defined, the Project Owner will submit this plan to the Environmental Impact Assessment System, in accordance with legislation in force. In line with the development of the Compliance Plan for environmental legislation applicable to the Project, the General Regulations applicable in this instance are indicated below:

Decree with Force of Law N°4, dated 05 February, 2007, setting forth the Recast, Coordinated, and Systematized Text of the General Law on Electrical Services.

The General Law on Electrical Services governs the generation, transmission, distribution, and regimen of concessions and tariffs applicable to electrical energy, and the functions of the State with regard to these areas.

Supreme Decree N° 327, Regulations Regarding the General Law on Electrical Services

The Regulations Regarding the General Law on Electrical Services establish, in their 8th Article, that hydroelectric power plants, electrical substations, and transmission lines may be installed without making a request for a concession, when the interested party wishes. These concessions may be provisional (in order to study projects) or definitive. A definitive concession is granted by a supreme decree issued by the Ministry of the Economy, by order of the President of the Republic. Permits relating to electrical installations that do not require concessions are granted by the corresponding Municipal Governments.

For further information and analysis on the aforementioned regulations, with regard to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see **Sections 3.1.6 and 3.1.7 of Chapter 3 of the EIS**, where more detailed versions of this information can be found.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature

no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of

a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

PRO.03.02 Tunnels

The majority of the Project is planned for installation underground. The general characteristics of the tunnels are described in Chapter 2 of the EIS, Table 2.2.5 (for detailed geological information on the path taken by the tunnels, see Annex 46 of the EIS).

For an evaluation of the impact and environmental management measures associated with underground installations, see Chapter 6 of the EIS.

Annex 45 of the EIS, Hydro-Geology of Underground Works, presents a general description of the geological conditions that are expected to be found along the lengths of the tunnels; expected permeability based on geological knowledge and hydro-geological conditions in the area, incorporating experience gained during the construction of tunnels for the Alfalfal Plant, which has been operative for more than 17 years; as well as a description that includes the design of the tunnels, providing a brief explanation of the methods to be used to reduce and control water seepage.

With regard to the impact of the path taken by the tunnel passing underneath the El Morado Natural Monument, and measures to be taken to respect the area, see Section I, Responses 4, 5, and 6, in the Addendum.

SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

SUE.02 Soils, meadows, and wetlands

The Project Owner has conducted a number of studies with the aim of characterizing the vegetation of summer grazing areas (La Engorda) (see details in Addendum 1, Annex 6, and in Chapter 5 of the EIS), as well as flora and vegetation studies in the Project's area of influence (EIS, Chapter 5).

These studies contain information compiled in fieldwork campaigns conducted in Fall 2005, Spring 2006, November 2007, March 15 and 16, 2008, and September 2008, which add to the body of knowledge available regarding vegetation in these areas.

The Lo Encañado area shall be assigned a status of controlled access area for works contractors at all times: it shall not be subject to any intervention whatsoever. For more information on vegetation areas that could be affected by the construction works, and to learn about mitigation measures proposed by the Project Owner, you are advised to review Annex 42 of the EIS and Annex 6 of the Addendum.

With regard to environmental regulations that apply specifically to vegetation and plant life, the Project Owner shall be subject to:

Supreme Decree 366 (Exploitation of Tamarugo, Carob, Chañar, Guayacán, Aextoxicon , Charcoal, Acacia, Boldo, Maiten, Litre, Bollen, and Quillay). This legal instrument governs the felling of trees and bushes.

Supreme Decree 4363 and D.L 701 (Approving the Definitive Text of the Law on Woodland and Regulations on Forest Promotion).

Article 2 of the Woodland Law establishes an obligation that land classified as for preferential woodland land use, as well as natural and artificial woodlands, are subject to woodland management plans approved by the National Forestry Commission (CONAF). Furthermore, Article 21 of Decree Law 701 establishes that any felling or usage of native woodland shall be subject to the CONAF's prior approval of the corresponding management plan.

Decree 82 (Prohibiting the Felling of Trees and Bushes in Indicated Andean High Mountain and Foothill Areas)

Article 102 Sector Environmental Permit (Permit for the felling or exploitation of native woodland, in any type of land, or plantations located in land with preferential characteristics for woodland use).

For further information and analysis on the aforementioned regulations and permits, as applicable to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see Sections 3.2.6 and 3.3.7 in Chapter 3 of the EIS.

Remark N° 426

1. Water

Construction

The Project Owner should identify all natural watercourses and streams that will be subject to intervention under the project, indicating their locations with geographic coordinates.

The Project Owner should be reminded that all intakes and conduits crossing natural watercourses must be submitted for approval by the directorate general of water, as stipulated in Articles 41 and 171 of the Water Code. Notwithstanding the above, the Project Owner should submit all background information in application for the Sector Permit described in Article 106 of the SEIA Regulations.

The Project Owner does not indicate whether it possesses water usage rights for drinking water supply to the encampments that are to be installed.

Implementation

The Project Owner does not indicate the water usage rights that it holds for all intakes and water discharge points.

The Project Owner should submit all discharges into the Colorado and Maipo Rivers for approval by the Directorate General of Water, as stipulated in Articles 41 and 171 of the Water Code.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

Remark N° 427

2. Baseline

The Project Owner fails to present a map showing all water intakes, channels, wells, and/or other water capture works located throughout the project's area of influence, defined as all points between the point of water abstraction in the El Volcán area and the point of discharge into the Maipo River, including all natural watercourses involved.

The Project Owner should prepare a description of the influence to be caused by the project through reductions in flow rates, as they affect all works shown on this map.

The Project Owner has not conducted hydrological, geological, and soil studies in the project's area of influence. This is of extreme importance, as the geology of the Maipo River sub-basins includes pockets of river and glacial/river sediment fill, with some influence from volcanic lava, which include highly permeable material comprising a buildup of gravel and boulders. These formations, which are present in the beds of rivers and streams, enhance infiltration of water into the ground and sub-surface flow (Evaluation of the Surface Water Resources of the Maipo River Basin, Government of Chile, DGA, S.D.T. N° 145).

At the same time, as the project includes significant lengths of tunnels (approx. 70 kilometers) the study does not include hydrogeological studies that cover the relationships between these excavations and the groundwater and underground water flow present below ground in the area.

This is particularly relevant as the tunnels cross underneath the El Morado Reserve, including glaciers and a lake, and this land is owned by CORFO (administered by Aguas Andinas) and serves to back up drinking water and reserves for Santiago; as well as the Francisco de Lagunillas Reserve, which includes the headwaters of the San José Stream, which is the source of drinking water for the settlements of San José de Maipo and irrigation water carried along 4 channels to agricultural land holdings, the cemetery, the sanatoria, and the public infrastructure of the town of San José de Maipo.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order

to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS**.

This section presents information characterizing the basins and tributaries of the Volcán, Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex 13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS**.

AGU.03.02 Geology

The baseline studies used in determining the geological characteristics of the Project area are presented in **Section 5.3.6 of the EIS**. Additionally, the **hydro-geological baseline studies** for the Project area are presented in **Section 5.3.5.3 of the EIS**. Complementary information is also provided in **Annex 45 of the EIS**.

Both of these studies start with general background information on the area where the Project is to be installed, going on to present a detailed description of the geological and geomorphological characteristics of specific areas where Project works or activities are planned.

Complementary information is provided in **Annex 8 of the Addendum**.

AGU.03.03 Underground water

Underground water will not be affected in any way by the operation of the Project. This is the case because the underground water flow capacity in each sector of the aquifer associated with the Maipo River is much lower than the minimum flow running through each section of the river, and therefore under all circumstances the aquifers shall remain saturated. Thus, underground water sources present in the area shall also not be affected.

The PHAM plans to construct 70 km of tunnels, of which approximately 50 km correspond to headworks or hydraulic pressure tunnels, the remainder being access tunnels for use during construction of the project and for subsequent operation of the power plants (see **EIS Chapter 5, Section 5.3.5.3**).

Most of these tunnels have been designed to operate at variable internal pressures, with a maximum achieved at certain points of a little more than 450 m. The design requirement for these tunnels is that the lower limit of principal compression in the surrounding rock medium is always less than the operating pressure, such as to maintain a sufficient safety margin to prevent alterations in natural permeability dynamics through hidrojacking. In areas where this design principle is not guaranteed, the Project plans to install impermeable tunnel linings (**EIS, Annex 45.4**).

During the excavation of these tunnels, it is possible that the work front may have to pass through permeable rock strata - leading to seepages of water into the tunnel, the magnitude of which will depend on the permeability of the rock, the depth of the tunnel, and the level of the water table. In some areas, tunnel wall treatments may have to be applied in order to prevent water transfer into or out of the headworks tunnels.

The Project does not plan to make use of any water seepages that may arise, in the generation of electricity. Additionally, the overarching design principles underpinning the Project are oriented towards limiting seepages during construction, in order to establish suitable conditions for efficient tunnel excavation activities. The same principle applies to methods to limit the infiltration of water from the tunnels into the rock mass, thus avoiding water loss during operations.

Additionally, these procedures guarantee that any groundwater that may intercept the tunnels shall suffer no change in its natural hydrological dynamics, or impact on any foreign components or water other than the water entering the system (**EIS, Annex 45**). Special attention will be paid to the quality and characteristics of any water that may eventually return to the natural water system through the tunnel access windows, and therefore construction contracts will specify measurements that must be made and the treatment that shall be required for subsequent disposal of such water, in order to ensure compliance with the quality requirements for water discharge into natural watercourses, under regulations currently in force.

In the event of seepages of water at high temperature and possible acidic composition, it is important to make clear that in general there shall be no major differences in the methods used to render the tunnel walls impermeable. During all site surveys conducted, research boreholes and surface geological maps produced to date applying to the areas through which the tunnels will pass, no evidence whatsoever has been found to lead to any prediction of the presence of water at high temperatures, or with mineral or acidic contamination. As additional background

information,

during the construction of the Alfalfal Plant - with the excavation of 35 km of tunnels - no events similar to those indicated above occurred. Notwithstanding the above, the specification establish that, in locations located close to potentially critical areas, the contractor must drill survey boreholes of between 25 m and 30 m in length ahead of the tunnel work front, in order to gain early warning of seepage problems and thus be able to apply impermeable tunnel wall treatments as required. See **EIS, Annex 45.4.**

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

AGU.04.05 Drought from infiltration of minimum ecological water flow

The Project's potential indirect impact on groundwater in the area of influence has been evaluated in detail in the report attached as **Annex 25 of the EIS**. According to this analysis, all aquifers located throughout the areas of influence will not be affected in any way. This is the case because the underground water flow capacity in each sector of the aquifer associated with the Maipo River is much lower than the minimum flow running through each section of the river, and therefore under all circumstances the aquifers shall remain saturated. Thus, underground water sources present in the area shall also not be affected.

SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

SUE.02 Soils, meadows, and wetlands

The Project Owner has conducted a number of studies with the aim of characterizing the vegetation of summer grazing areas (La Engorda) (see details in Addendum 1, Annex 6, and in Chapter 5 of the EIS), as well as flora and vegetation studies in the Project's area of influence (EIS, Chapter 5).

These studies contain information compiled in fieldwork campaigns conducted in Fall 2005, Spring 2006, November 2007, March 15 and 16, 2008, and September 2008, which add to the body of knowledge available regarding vegetation in these areas.

The Lo Encañado area shall be assigned a status of controlled access area for works contractors at all times: it shall not be subject to any intervention whatsoever. For more information on vegetation areas that could be affected by the construction works, and to learn about mitigation measures proposed by the Project Owner, you are advised to review Annex 42 of the EIS and Annex 6 of the Addendum.

With regard to environmental regulations that apply specifically to vegetation and plant life, the Project Owner shall be subject to:

Supreme Decree 366 (Exploitation of Tamarugo, Carob, Chañar, Guayacán, Aextoxicon, Charcoal, Acacia, Boldo, Maiten, Litre, Bollen, and Quillay). This legal instrument governs the felling of trees and bushes.

Supreme Decree 4363 and D.L 701 (Approving the Definitive Text of the Law on Woodland and Regulations on Forest Promotion).

Article 2 of the Woodland Law establishes an obligation that land classified as for preferential woodland land use, as well as natural and artificial woodlands, are subject to woodland management plans approved by the National Forestry Commission (CONAF). Furthermore, Article 21 of Decree Law 701 establishes that any felling or usage of native woodland shall be subject to the CONAF's prior approval of the corresponding management plan.

Decree 82 (Prohibiting the Felling of Trees and Bushes in Indicated Andean High Mountain and Foothill Areas)

Article 102 Sector Environmental Permit (Permit for the felling or exploitation of native woodland, in any type of land, or plantations located in land with preferential characteristics for woodland use).

For further information and analysis on the aforementioned regulations and permits, as applicable to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see Sections 3.2.6 and 3.3.7 in Chapter 3 of the EIS.

Remark N° 428

3. Environmental impacts identified: flora and fauna

- The Project Owner fails to identify the species that shall be affected by flow reductions in the El Volcán area sub-basin, and similarly fails to identify the conservation status and water and water-flow requirements of species identified.
- The Project Owner fails to identify environmental impacts affecting the ecosystem surrounding the Aucayes Stream, arising as a result of a change in the natural status of that stream when the project becomes operational. If the Project Owner determines that major environmental impacts will occur, it should present a suitable mitigation or compensation plan.
- The Project Owner should also clarify whether the total number of Guayacán trees to be planted includes 5,490 plus the 30% transplanted, or whether the figure of 5,490 includes the 30% of specimens to be transplanted.
- The Project Owner presents a management plan for approval by CONAF, which must bear the signatures of the owners of the land holdings affected. The Project Owner has submitted a management plan without the signature of the owner of the land that it plans to reforest, leaving the restoration and compensation plans dependent on approval by CONAF, following the submission of the plan signed by the Ministry of Public Goods.
- The Project Owner is requested to clarify the situation and the presentation of the Felling Management and Reforestation Plan to CONAF, and to explain how the Ministry of Public Goods and the Chilean Army have agreed to sign this management plan.
- The Project Owner states that individuals of the plant species Espino, Maitén, Litre, Bollén, and Quillay - which are protected under Ministry of Agriculture Supreme Decree 366/44 - will be negatively affected. However, no plan whatsoever is presented relating to these species.
- The Project Owner has not submitted a permit granted by the Agriculture and Livestock Service for the usage of individuals of the species Quillay, as required under the aforementioned decree.
- The aforementioned management plan submitted by the Project Owner does not include any mitigation and/or restoration measures for the felling of Quillay, Bollén, Maitén, Espino, and Litre trees, even though the Project Owner itself recognizes that "the high percentages of endemism and the threat level affecting the Central Chile ecosystem - which features the country's highest levels of population density (Cunill, 1970; Aschmann & Balrre, 1977; Fuentes & Hajek, '1979; Espinoza & Hajek 1988) - have led to the declaration of the area as a global biodiversity hotspot (Cowling et al 1996; Arroyo & Cavieres, 1997; Arroyo et al. 1999; Myers et al. 2000) (page 5.4-1, Chapter 5).
- On page 5.4-3 of Chapter 5, the Project Owner states that "the region's plant landscapes are complex as a result of their altitude situation, as this is an area of high climatic variability (see: D i Castri & Hayek, 1982), and additionally because the area exhibits the country's highest level of vegetation alterations"; yet it plans to conduct activities impacting 31.23 hectares of woodland, 70.39 hectares of Andean scrubland, 14.04 hectares of sclerophyllous scrubland, 23.38 hectares at La Engorda 1.3.13h hectares at Aucayes 10.05 hectares at El Encañado and 9.78 hectares at the Yeso River; as well as 6.28 hectares of meadows/wetlands. The reduction in areas of nationally and internationally significant biodiversity is in clear contravention of the requirements set forth in the Regional Biodiversity Conservation Strategy and the Andean Santiago Action Plan.
- The Project Owner plans to fell plant life in the High Andes and Andean Foothill area, which is protected under Ministry of Agriculture Supreme Decree 82/74; such actions must be approved by the Agriculture and Livestock Service, following a report from CONAF, and this approval may only be granted when the plan pertains to the construction or implementation of works for the public benefit - which does not apply in this particular case.
- The Project Owner plans to fell vegetation in gorges and areas with a slope gradient greater than 45% which is prohibited under the Woodland Law (Supreme Decree 4.363/31 Articles).
- The Project Owner has not submitted a study showing that the ecological flow rates for the watercourses subject to intervention will be adequate to avoid impact on the Torrent Duck, the Lesser Bagre, and the 3 species of amphibians affected (page 6.4-49). The documentation merely states that "before starting construction activities, the Project Owner agrees to start a population and habitat condition study for the black spiny chest frog *Alsodes nodosus*; *Spalacopus cyanus* (cururo) and for *Merganetta armata* (torrent duck) in the project's areas of direct influence. project" (page 6.4-46). The situation described above does not ensure that the species mentioned will not be affected, or even disappear from their habitats - an eventuality that would severely risk international compliance by Chile with regard to the Convention on Biological Diversity, which was adopted as a Chilean law in May 2005.
- The Project Owner states that "with the project, the individuals (amphibians) that inhabit the areas alongside the watercourses that will suffer reductions in flow rates - and consequent reductions in the area of the riverbed under water - will move locally to lower areas that are permanently under water, in accordance with their requirements for feeding or mating (page 6.4 -43). This assertion fails to take into account the fact that amphibians are highly sensitive to temperature gradients, and it is therefore not certain that these species will move to other locations along the watercourse. This will severely endanger the biodiversity of the area to be subject to intervention, clearly infringing the requirements stipulated in the Metropolitan Region Biodiversity Conservation Strategy.
- The Project Owner should evaluate the environmental impact on amphibians, aquatic birds, and fish species during the PHAM's operations phase, as the current documentation merely states that "the impact on the fauna of the project's area of influence shall consist of moving or displacing of local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity (page 6.4 -50).
 - The Project Owner is requested to specify the effects that will be observed during the Project's operations phase, affecting fish species, amphibians, and aquatic birds.

**F&F Biodiversity Impact
Flora and Fauna**

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. PHAM. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70

birds, 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.01 Regulations

The Project Owner shall comply with all legal environmental and sector-based regulations and requirements in force and applicable to the Project during the different phases of its development. The Project Owner has guaranteed compliance with the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and compliance with sector environmental permits.

Environmental regulations that apply to the Project have been identified based on its activities' potential environmental impacts affecting flora and fauna. The full extent of these regulations is included in **Chapters 3 and 4 of the EIS, and in Section 2, Question 1 in Addendum 1**.

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neopteris curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Liolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopus cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

F&F.02.02 Form of mitigation

Aquatic flora and fauna

The Project calls for a suite of multi-purpose environmental management measures that aim to minimize its effects on living organisms, including: minimization of watercourse areas to be subject to intervention by prioritizing such works for late summer and early fall seasons (period of lowest flow rates), the adoption of special precautions to prevent accidental spillages into watercourses (prohibition of the storage of lubricant drums in or

near watercourses, etc), and permanent maintenance of ecological flow rates. For more detailed information, including technical documentation that complements the information described above, see Annex 17 of the Addendum.

Terrestrial Flora and Vegetation

In order to prevent and/or minimize the Project's effects on plant life, it plans to adopt a number of integrative measures: micro-routing in advance of starting work on-site, in order to identify specimens of plants listed in any conservation category and subject to impact; compensation with the planting of 10 specimens for every one destroyed, in the case of non-woodland species listed for conservation; implementation of a woodland management plan applicable to woodland areas, which describes its measures in accordance with Article 5 of the Woodland Law; implementation of vegetation restoration plans at muck disposal sites, encampments, artificial slopes, and tunnel access terraces (EIS, Annexes 7 and 29). More in-depth information on complementary measures is provided in Annex 6 of Addendum 1.

Terrestrial fauna

Specific wildlife environmental management measures have been proposed for each particular species, taking into account prior experience in the success of these measures in similar projects. These measures will be implemented in continual coordination with the Servicio Agrícola y Ganadero. Principal measures include: capture of individuals belonging to species of conservation interest for rescue and relocation; controlled perturbation actions; and habitat replacement. Other measures are based on the use of signage, training for Contractors, and contractual requirements for on-site supervision (see details in Section 6.4.1.6 of the EIS). See Annex 4 of the Addendum for the native wildlife rescue and relocation plan.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1)

Chapter 3 of the EIS provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

Remark N° 429

4. Environmental impacts identified: Water

The Project Owner defines ecological flow rates using a process that applies hydrological methodologies to set water usage rights; this methodology does not incorporate important ecological and environmental variables.

- The Project Owner fails to identify or evaluate environmental impacts associated with flow reductions in the El Volcán area sub-basin.
- The Project Owner fails to identify impacts affecting the project area of influence's drainage network, resulting from the transfer of water from one river basin to another.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows

maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 430

5. Environmental impacts identified: landscape

The Project Owner fails to identify impacts affecting the landscape that may result from the installation of encampments for project employees, the construction of new roads, and muck disposal heaps, particularly in the Cajón del Colorado canyon area. Article 11 part e) refers to the alteration of an area's landscape or tourism value, of significant magnitude or duration. The project will lead to an irreversible impairment in maintaining the area's natural assets, and potential environmental damage to an area with significant value for tourism.

Thematic responses

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.02 EIS Additional and Complementary Information

In accordance with consultation procedures conducted by oversight services, further studies and information have been incorporated into Addendum 1, which complements existing information provided in the EIS. Regarding ecological flow rates (**Annex 17**), cultural heritage (**Annex 14**) and the management of summer grazing areas (**Annex 6**).

PRO.03.03 Encampments and Works Installations

For details on the creation of encampments and works installations, please see Chapter 2, Section 2.3.2.4 in the EIS.

For information on PHAM encampment and work site approach routes, see EIS, Chapter 2, Table 2.1.2,

For information on regulations, see Chapter 3 of the EIS and Annex 33, General Operating Regulations for Encampments and Work Sites.

For information on the management of waste produced at work sites and encampments, see Annex 18 of the EIS, "Site Installation Waste Management Plan".

For information on the discharge of treated wastewater, see Response 26 in the Addendum.

For information on human consumption of water at encampments and works installations, see Chapter 2, Section 2.3.2.4, parts b and i.

For an assessments of the impact of the creation of encampments and works installations, monitoring methods, and conditions, see Chapter 6 of the EIS.

TUR Tourism

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.03 Visual impact

The Project is to be located, taking into account esthetic and perceptual considerations and emphasizing the characterization and appraisal of the issues of visibility, quality, and visual

fragility of the landscape.

In terms of Landscape Alteration or Landscape Impact associated with this infrastructure project, potential effects are classified as either limited duration - generally applying during the construction phase - or permanent, for effects that shall persist during the operations phase and continue throughout the working life of the Project. A qualitative and qualitative methodology is used to study these effects, whereby the first phase consists of identifying sources of visual

impact, and the second phase relates to identifying and classifying environmental impacts.

As a general rule, it is assumed that impact on the landscape during the construction phase shall be temporary, mainly due to the transitory nature of the sources of impact, the low level of prior human activity in certain areas, and the relatively low level of physical and visual accessibility of a significant proportion of the area subject to intervention.

As most of the Project construction works will be situated underground, during the operations phase the main visual signatures of its existence will be the intakes and access roads.

For further information on the methodology used for landscape impact assessment, see **Chapter 6, Section 6.1.4.10 of the EIS, and Annex 17 of Addendum 1.**

Remark N° 431 6. Biodiversity

The Project in question is to be installed in an area of great environmental value and fragility, as shown by the large number of administrative acts and policies already passed to protect it:

This is an Officially Protected Area under MINAGRI Supreme Decree 82/1974, which prohibits the felling of trees and bushes - which was not taken into account in the evaluation of this project - as is the case for the decree protecting *Laretia acaulis* (Santiago Llaleta).

This is an Officially Protected Area under Supreme Decree 403/2004, which modified Supreme Decree 693/2003, both issued by MINAGRI, establishing a closed season for hunting and capturing wild animals.

The area was declared an Area of Tourism Priority and Interest by President Ricardo Lagos in 2001, by Supreme Decree 1,224/75, as part of the cultural heritage of the district of San José de Maipo.

It is a biodiversity conservation priority area under the Regional Biodiversity Strategy, an initiative launched by CONAMA RM with decision making by the public services and the community through a citizen participation process. The Andean Santiago Action Plan, which groups together 4 biodiversity conservation priority areas, was approved by CONAMA by Exempt Decree 585 in December 2005. This is a significant part of the Region, serving as an enclave for wild plants and animals native to the Andean environment that are listed for conservation. The area is of great importance due to its environmental value and biological diversity. The area also belongs to a high altitude ecosystem with a Mediterranean climate, and forms part of the suite of resources that Chile has agreed to protect at the Biological Diversity Summit, where the decision was taken to address the issue of mountain ecosystems in greater depth at the 7th Conference of the Parties (Kuala Lumpur, Malaysia, March 2004). Therefore, the issue of mountains was the main item on the agenda at the 8th meeting of the SBSTTA (Subsidiary Body on Scientific, Technical and Technological Advice), held in March 2003; this meeting defined a working program that aimed to achieve a significant reduction in the loss of biodiversity from these ecosystems by 2010. The Andean Santiago area is legally and administratively declared a protected area, as specified in two protection decrees: Ministry of Agriculture Supreme Decree 82/74 on plants and Supreme Decree 693/2003, which declares the area as a no-hunting zone for a period of 30 years, reflecting the political will on the part of the authorities, landowners, and the community to promote, protect, and recover the gene pools and populations of threatened native species.

Thematic responses

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles,

70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

Remark N° 432

7. Water and soil

Regarding Article 11 part b), it is considered that the project will cause significant adverse effects on the quality and quantity of renewable natural resources, particularly soil and water. The area to be subject to intervention is classified as an Ecological Preservation Area under Art. 8.3.1.1 of PRMS Resolution 20/94 establishing that such areas "will be kept in their natural state, in order to preserve and contribute to the environment's quality and equilibrium, as well as to preserve landscape heritage". The area is protected under these regulations due to its great value as a water reservoir and to preserve snow resources, as well as its biodiversity value. Therefore, the area's water sources must be protected as they supply drinking water to Santiago, and because the area's soils are fragile and susceptible to erosion. Additionally, soil must be protected as established in Art. 39 of Law 19,300.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS**.

This section presents information characterizing the basins and tributaries of the Volcán, Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex

13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS**.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the

Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of

these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of

water from the discharge outlets of the Alfafal I and Alfafal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfafal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

SUE.01 Regulations

The Project Owner is subject to the following regulations, which are specified in detail in Chapter 5 of the EIS, Section 5.7.2.1, regarding the Santiago Metropolitan Master Plan.

With regard to planning instruments, the PHAM is to be implemented in the district of San José de Maipo, which does not have a District Master Plan (one is currently being prepared), and which only has current urban limits for the settlements of San Alfonso, La Obra, San José de Maipo, El Melocotón, San Gabriel, and Las Vertientes. Conversely, the Santiago Metropolitan Master Plan (PRMS) establishes a number of land use regulations that apply to the project area, most of which are related to ecological preservation and/or protection and risks. Most of the district's surface area is classed as Ecological Preservation Area, which aims to maintain a zone's natural state, in order to preserve and contribute to the environment's quality and equilibrium, as well as to preserve landscape heritage (see further information in the conclusions stemming from analysis of regulations, in Section 5.7.3, Chapter 5 of the EIS).

Supreme Decree 366 (Exploitation of Tamarugo, Carob, Chañar, Guayacán, Aextoxicon, Charcoal, Acacia, Boldo, Maiten, Litre, Bollen, and Quillay). This legal instrument governs the felling of trees and bushes.

Supreme Decree 4363 and D.L 701 (Approving the Definitive Text of the Law on Woodland and Regulations on Forest Promotion).

Article 2 of the Woodland Law establishes an obligation that land classified as for preferential woodland land use, as well as natural and artificial woodlands, are subject to woodland management plans approved by the National Forestry Commission (CONAF). Furthermore, Article

21 of Decree Law 701 establishes that any felling or usage of native woodland shall be subject to the CONAF's prior approval of the corresponding management plan.

Decree 82 (Prohibiting the Felling of Trees and Bushes in Indicated Andean High Mountain and Foothill Areas)

Article 102 Sector Environmental Permit (Permit for the felling or exploitation of native woodland, in any type of land, or plantations located in land with preferential characteristics for woodland use).

For further information and analysis on the aforementioned regulations and permits, as applicable to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see Sections 3.2.6 and 3.3.7 in Chapter 3 of the EIS.

SUE.02 Soils, meadows, and wetlands

The Project Owner has conducted a number of studies with the aim of characterizing the vegetation of summer grazing areas (La Engorda) (see details in Addendum 1, Annex 6, and in Chapter 5 of the EIS), as well as flora and vegetation studies in the Project's area of influence (EIS, Chapter 5).

These studies contain information compiled in fieldwork campaigns conducted in Fall 2005, Spring 2006, November 2007, March 15 and 16, 2008, and September 2008, which add to the body of knowledge available regarding vegetation in these areas.

The Lo Encañado area shall be assigned a status of controlled access area for works contractors at all times: it shall not be subject to any intervention whatsoever. For more information on vegetation areas that could be affected by the construction works, and to learn about mitigation measures proposed by the Project Owner, you are advised to review Annex 42 of the EIS and Annex 6 of the Addendum.

With regard to environmental regulations that apply specifically to vegetation and plant life, the Project Owner shall be subject to:

Supreme Decree 366 (Exploitation of Tamarugo, Carob, Chañar, Guayacán, Aextoxicon, Charcoal, Acacia, Boldo, Maiten, Litre, Bollen, and Quillay). This legal instrument governs the felling of trees and bushes.

Supreme Decree 4363 and D.L 701 (Approving the Definitive Text of the Law on Woodland and Regulations on Forest Promotion).

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Decree 82 (Prohibiting the Felling of Trees and Bushes in Indicated Andean High Mountain and Foothill Areas)

Article 102 Sector Environmental Permit (Permit for the felling or exploitation of native woodland, in any type of land, or plantations located in land with preferential characteristics for woodland use).

For further information and analysis on the aforementioned regulations and permits, as applicable to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see Sections 3.2.6 and 3.3.7 in Chapter 3 of the EIS.

Remark N° 433

1. BASELINE AND PROJECT AREA OF INFLUENCE

- In accordance with the background information submitted, the Project Owner caused impacts to areas of environmental relevance: the El Morado Monument (SNASPE), the San Francisco de Lagunillas Sanctuary (CMN) and the Volcán Land Holding, El Yeso Reservoir, and Colorado River areas, located in sites classified as priority levels 4 and 5 under the Santiago Metropolitan Region Biodiversity Conservation Strategy. In addition to the insufficient nature of the baseline on surface water resources in these land areas, as the Project Owner does not accredit water rights at the points of abstraction and discharge; the Project Owner similarly fails to present studies on how underground water resources in these areas will be affected, and fails to present baseline information on the area's hydro-geology and relationships between surface and underground water. The tunnels planned for the project cross underneath the El Morado Natural Monument (SNASPE), the San Francisco de Lagunillas Sanctuary (CMN) and the Laguna Negra/Encañado Basin - areas of vital importance in the input of water resources into the Maipo Basin, and for the biodiversity of priority sites. However, the version of the environmental impact study submitted by Project Owner AES Gener does not provide information on the geo-environmental characteristics of these areas, or the characteristics and exact depth of the works to be built under these areas of glaciers, lakes, creeks, and the headwaters of streams; nor does it address expected impacts, or environmental management and restriction measures to be implemented. The Project Owner should therefore provide information on the underground characteristics of these sites, and details on the dimensions and depth of works planned. All land holdings subject to impact under the PHAM belong to the system of Priority Biodiversity Conservation Sites in the Santiago Metropolitan Region, and are included in the Andean Santiago Action Plan, approved by COREMA RM through Exempt Resolution N 585, in 2005. The layout of the Alfalfal II Tunnel passing through the San Francisco de Lagunillas Land Holding, for which I am responsible, passes through the deep gorges of the Peladeros and Piuquencillos mountains, which nourish the headwaters of the Vega Quemada, Calabozo, Rosario, Del Medio, and Las Quinguas Streams (which supply all irrigation water for the town of San José de Maipo and surrounding areas, as well as drinking water for the settlement of Santa María del Estero y los Rulos). They also feed water into the meadows/wetlands of Santa Teresa, Rincón de los Turistas, Pedernalillo, and La Tetona, and the Llanos and Laguna Barrosa wetlands. The Project Owner should provide complete information on this area of land that will be subject to intervention, identifying mountains, creeks, streams, meadows/wetlands, lakes, and the area's surface and underground hydrological network. The Project Owner should conduct a study to characterize the protected areas that will be subject to intervention, specifying the geological and hydrological conditions of all areas at all depths, as well as the interactions between these hydro-geological units and the Morado, Encañado, and San José Streams, which they drain into. As well as information on impacts on flow rates, the Project Owner should include detailed topographic cartography of this area.
- 1.3 A similar survey should be conducted for the Aucayes Stream area around the Hacienda Río Colorado land holding, determining the area of influence of the Alfalfal II Tunnel, the upper Aucayes Stream basin, and detailed hydro-geological mapping of the area's landforms. The Project Owner should also specify the 15 works that the project will implement within these protected areas: tunnel survey drilling and final excavation techniques; how installations will function during project operations; and relationships with the area's geological structure and hydrological network, including interactions with both underground and surface watercourses, and the area's high elevation wetland systems. The Project Owner should incorporate detailed topographic cartography for these 3 areas, and include information on the dimensions and depth underground of the works to be built in this area. If geological structures and underground and surface watercourses are to be compromised, directly or indirectly (through structural failure, water seepage or other effects resulting from the construction and operation of the tunnel along this new layout) the Project Owner should include proposed prevention and mitigation measures to protect the areas' meadows and springs, and to maintain the normal dynamics of existing hydrological networks.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services

that specialize

in this field: Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see **Table 2.3.4** in **Chapter 2 of the EIS.**

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS.**

This section presents information characterizing the basins and tributaries of the Volcán, Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex 13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS.**

AGU.03.02 Geology

The baseline studies used in determining the geological characteristics of the Project area are presented in **Section 5.3.6 of the EIS.** Additionally, the **hydro-geological baseline studies** for the Project area are presented in **Section 5.3.5.3 of the EIS.** Complementary information is also provided in **Annex 45 of the EIS.**

Both of these studies start with general background information on the area where the Project is to be installed, going on to present a detailed description of the geological and geomorphological characteristics of specific areas where Project works or activities are planned.

Complementary information is provided in **Annex 8 of the Addendum.**

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on

residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly

frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

PRO.03.02 Tunnels

The majority of the Project is planned for installation underground. The general characteristics of the tunnels are described in Chapter 2 of the EIS, Table 2.2.5 (for detailed geological information on the path taken by the tunnels, see Annex 46 of the EIS).

For an evaluation of the impact and environmental management measures associated with underground installations, see Chapter 6 of the EIS.

Annex 45 of the EIS, Hydro-Geology of Underground Works, presents a general description of the geological conditions that are expected to be found along the lengths of the tunnels; expected permeability based on geological knowledge and hydro-geological conditions in the area, incorporating experience gained during the construction of tunnels for the Alfalfal Plant, which has been operative for more than 17 years; as well as a description that includes the design of the tunnels, providing a brief explanation of the methods to be used to reduce and control water seepage.

With regard to the impact of the path taken by the tunnel passing underneath the El Morado Natural Monument, and measures to be taken to respect the area, see Section I, Responses 4, 5, and 6, in the Addendum.

SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

Remark N° 434

2 The Project's Area of Influence covers more than half of the district of San José de Maipo, which is classified as a ZOIT Zone of National Tourism Interest.

In view of the scale of the works - roads, trails, water conduits, encampments and site installations, waste disposal heaps, and traffic effects - as well as other construction impacts, the project will have a significant effect on the road network, landscape value, and flow rates in rivers and streams - the key attractions of the ZOIT.

However, the Project Owner has not presented adequate information or analysis regarding the status of the ZOIT, covering impacts affecting the area as a whole with and without the project; rather, it merely proffers a partial statement that a particular intake will have little impact, that reductions in flow rate will not be perceptible from the road, or that an area lacks tourism initiatives. This approach falls far short of responding to the concerns of the district (local companies and Chambers of Commerce and of Tourism regarding short term and medium term impacts on tourism development and activities in the area. Therefore, the Project Owner is requested to present a study (which should be conducted by a body that is independent of the company's interests) into the project's impacts, works, and use of water resources from the rivers of the San José de Maipo ZOIT. This study should be conducted before the state services continue to analyze the project, and should be taken into consideration when COREMA is deciding on the project's Environmental Qualification.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the

dynamism of all activities in the District of San José de Maipo; iii)
Improvement in quality of life for many families, as family members
return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.03 Sports and leisure

In order to avoid the loss or modification of land usage patterns, changes in usage, or loss of income associated with potential reduction in perceptions of the value of the surrounding areas, in terms of the provision of leisure, tourism, education, and other related services, the Project has developed a suite of measures that aim to minimize its environmental impact, so as to preserve the features that lead to the high perception of value of the area among residents, visitors, and tourists. These measures include: installation of most works in underground settings, thus minimizing their visual impact; the preservation of ecological flow rates in rivers and streams; and revegetation and reforestation of affected areas.

Similarly, the Project has enacted a suite of further measures to minimize interference with traditional livestock industries, as well as tourism and mountain/river sports.

In this way, the Project has taken all steps necessary in order to mitigate impacts on the environment, which will allow the area to retain the characteristics that make it so attractive for open-air education, tourism, and leisure activities. This will allow the project to operate alongside existing activities conducted in this area.

A wide-ranging suite of monitoring activities will be implemented to verify the effectiveness of the environmental measures (for more information, see **Chapter 8 of the EIS**). In parallel, and in order to verify that the Project does not affect cultural land usage patterns, applicable indices will be included for monitoring under the Social Indicator Monitoring (SIM) program.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**.

CAL.05 Promoting entrepreneurship
The company has agreed to use its **Fundación Maitenes** foundation to set aside an **annual fund over a 10 year period starting in 2010**, to support local residents who formulate tourism development business plans for implementation in the area. These projects will be financed through funds open for competitive tenders; submissions will be evaluated on their own merit by a council of community representatives, which will select which projects will be funded.

The initiative to be implemented by the Fundación Maitenes may be linked to projects in progress run by public institutions and services in the district, related to the two lines of action that the foundation has agreed to support. This linkage may help to strengthen state-run initiatives and foster sustainability over the course of time for the actions supported by the foundation, during the period in which the program is active.

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.01 River sports

During the operations phase, the activities of the PHAM shall not directly or indirectly interfere with tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. Furthermore, the PHAM shall have no significant effect on boating activities on the Maipo River as a result of reductions in river flow rate; an analysis is presented in Annex 17 of the Addendum modeling a number of hydrological scenarios (1), concluding that the PHAM shall not affect the current situation in rafting and kayaking activities conducted in the area between San Gabriel and San José de Maipo.

In order to establish an analysis comparing the current Maipo River boating situation with predictions for the situation with the Project operational, the variables of flow rate, river width,

and water

depth were modeled, as valid indices to establish conditions for boating activities in the Maipo River.

This analysis showed that the Project shall not interfere with tourism activities conducted on the Maipo River, in view of estimates that in a dry year, the magnitude of variations in flow rate and water depth will not cause interference with boating activities.

For more information, see **Annex 17 of Addendum 1**.

- (1) The hydrological analysis used to evaluate reductions in flow rate is based on a statistical record going back 50 years, thus ensuring that seasonal and annual variations are incorporated into the analyses conducted.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**.

The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayes, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions.

The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS**.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management

measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, roadworks, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

VIA.04 Damage to roads and trails

The level of intervention to be generated by the Project was determined based on levels of saturation and deterioration of service levels, arising as a result of vehicle traffic caused by the Project - this Project highway impact analysis therefore did not take into account wear and tear on the road surface, as this parameter is not relevant when truck traffic complies with weight limits established by the Ministry of Public Works' Highways Department. In this regard, the Project Owner will permanently supervise weight control, in order to ensure compliance with the stipulations made in Ministry Public Works Supreme Decree 158/1980 which establishes gross weight limits for highways, as well as Decree 200, dated July 1993 and Decree 396, dated November 1993, establishing gross weight limits for urban streets. In both cases vehicle weight may not exceed 45 tons. For more information on measures planned by the Project Owner to ensure compliance with these regulations, see specific information in **Chapter 3 of the EIS.**

Furthermore, the Project Owner plans to undertake the conservation of Route G-25 (El Volcán area) and Route G-455 to the El Yeso Reservoir. Details of the current condition of each of these routes and planned road conservation measures, see the Road Improvement Program, in **Annex 19** of the EIS.

Finally, in advance of the start of road conservation activities, the corresponding Projects were approved by the Santiago Metropolitan Region Regional Highways Department. With regard to areas of interest for tourism, the conservation of part of the highway network and year-round maintenance of the more remote stretches of Route G-455 to El Yeso and Route G-25 from El Yeso Bridge to the El Volcán area will improve accessibility, favoring an increase in influx of visitors or the arrival of visitors over lengthier periods of the year, as these areas are largely inaccessible to tourists for a significant part of the winter season.

Remark N° 435

3 WATER RESOURCES

- 3.1 AES Gener's interpretation of these hydrological studies draws estimates for average annual flow rates and ecological flow rates, based on rainfall measurements from the DGA's rain gauge stations in the area, but without incorporating restriction criteria based on projected increases in demand set forth in the water balances issued by the DGA for the Metropolitan Region, and variables established in prospective studies on climate variability in view of the effects of global warming. In particular, the Project Owner should incorporate the statistical rainfall projections for the moderate and severe scenarios in the "Climate Variability Study" prepared by the Geophysics Department at the Universidad de Chile for CONAMA, as part of the Second National Communication to the UNFCCC. It should also incorporate the information generation through the adaptation to climate change study for the agriculture sector conducted by specialists at INIA and the Faculty of Agricultural and Forestry Sciences at the Universidad de Chile, for the government. Historic statistical measurements do not constitute a sufficient baseline for flow rates in the river basin, as the company should also take into account parameters relating to temperature increases, evaporation, and declines in precipitation and snow reserves, as established in official documentation issued by state services in the sector.
- 3.2 With regard to the methodology used by the company to calculate flow rates, it should be pointed out that the study on terrestrial wildlife makes fundamental contributions for the establishment of ecological flow rates compatible with the conservation of the area's wildlife, with particular emphasis on species for which insufficient data exists to define a conservation status, as classified by the SAG and identified in the study on the area. Therefore, the study on land fauna should be completed in advance of establishing these ecological flow rates, with criteria restricted to hydrological considerations. As accredited by state services, the District of José de Maipo is protected under the PRMS; it contains sites listed as priority areas under the Biodiversity Conservation Strategy, and is internationally recognized as a critical biodiversity hotspot. The Project Owner's responses regarding information gleaned from surveys of the area to prevent environmental impacts are insufficient, as they are limited to a listing of procedures: an environmental pre-feasibility study, submission of an EIS, compliance with citizen participation requirements, modifications to project engineering, etc. However, the EIS does not make clear how each measure is to be applied in each of the project's areas of influence; (with the sole exception of a more exhaustive study of the El Morado Natural Monument) Given that the project's intakes, water conduits, power plants, roads, and some spoil (muck) disposal heaps will be conducted or located in the Volcán Land Holding, the Hoya Laguna Negra and San Nicolás Stream Land Holding, Hijauela Lot N° 3, the Hoya Embalse el Yeso Land Holding, the San Francisco de Lagunillas Sanctuary, and Hacienda Río Colorado, all of which are declared to be level 4 or 5 priority sites in the Metropolitan Region Biodiversity Strategy; and that these land holdings are also protected as areas of scientific interest, under Ministry of Mining Decree 78, issued in January 2006; the Project Owner must submit information on the depth and diameter of the tunnels, the rock strata through which the tunnels will pass underneath the land holdings known as El Volcán, Hoya, Laguna Negra y Estero San Nicolás, Hijauela Lote 3, Hoya Embalse el Yeso, the San Francisco de Lagunillas Sanctuary, and Hacienda Río Colorado. Additionally, specific information is required on the particular measures to be taken to prevent water seepage into and out of the tunnels, and to prevent the degradation of underground and surface water resources present in the area. Similarly, information is required regarding measures to protect the soil, plants, and animal life of the areas included in these land holdings if affected by channels, tunnel exits, and roads. It should be pointed out that the Project Owner has provided this level of information when required to do so by the public services, regarding the El Morado Natural Monument; this submission should be expanded to include all Priority Sites, and the Project Owner should clarify whether it plans to use explosives and/or equipment that produces vibrations during the construction of the tunnels, roads, and other infrastructure items to be built in the land holdings known as Hoya, Laguna Negra y Estero San Nicolás, Hijauela Lot 3, Hoya Embalse el Yeso, San Francisco de Lagunillas, and Hacienda Río Colorado. This information is necessary in order to permit the evaluation of the impacts of these vibrations on the geological structure of the land areas (particularly the line to be taken by the tunnel) and associated hydro-geology that nourishes the areas meadows/wetlands and high altitude springs - and on the slopes of the San Francisco mountain and lake, and associated glaciers, as well as Rincón de los Turistas and Piuquencillos mountain, where glaciers are present. The Project Owner is requested to attach maps showing the area's topography, with information on local meadows and springs, and the glaciers and ice blocks of the El Morado Natural Monument and the Piuquencillos mountain.
- 3.3 The Project Owner should provide information on the site study, exploratory boreholes, surface maps and sub-surface, and hydrological and geological studies conducted at the land holdings known as Hoya Laguna Negra Lake and San Nicolás Stream, Hijauela Lot 3, Hoya Embalse el Yeso, the San Francisco de Lagunillas Sanctuary, and Hacienda Río Colorado to determine a land use baseline and the geophysical and hydrological characteristics of the areas where the Project Owner will conduct its works. The Project Owner should specify the longitudinal profile, depressions, and elevations (depth of the line to be taken by the new Alfalfal II Tunnel under the altitude of peaks and gullies) in the areas of the headwaters of the Vega Quemada, Calabozo, Rosario, Del Medio, San José, and Pedernalillo Streams, in the Peladeros, La Tetona, and Piuquencillos Basins, and in the San Francisco de Lagunillas Sanctuary, in order to identify the distance between the tunnel and the network comprising the area's hydro-geology and wetlands. The Project Owner should specify the longitudinal profile, depressions, and elevations (depth of the line to be taken by the new Alfalfal II Tunnel under the altitude of peaks and gullies) in the areas of the Piuquencillos and Tórtolas mountains in the Hacienda Río Colorado area, and the streams that flow into the El Medio, San José, and Aucayes Streams, and the area's high altitude meadows and wetlands.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS**.

This section presents information characterizing the basins and tributaries of the Volcán, Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex 13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of

habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists

of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses. Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Eastings	Northing
	Alto Volcán Stream gauge station	6,259,100	406,157
Alto Volcán	La Engorda Stream Bridge Rain gauge station	460,487	6,358,143
Alto Volcán	El Volcán River Bridge (Volcán South) Control station	407,468	6,259,751
Alto Volcán	La Engorda Intake Control station	406,780	6,260,782
Alto Volcán	Las Placas Intake Control station	407,181	6,260,081
Alto Volcán	Colina Intake Control station	405,768	6,261,231
Yeso River	El Morado Intake Rain gauge station	391,504	6,262,449
Yeso River	PBN (15) Control station	399,666	6,272,077
Colorado River	El Yeso Intake Rain gauge station	380,449	6,287,261
Colorado River	El Sauce Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the**

Addendum.SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

SUE.02 Soils, meadows, and wetlands

The Project Owner has conducted a number of studies with the aim of characterizing the vegetation of summer grazing areas (La Engorda) (see details in Addendum 1, Annex 6, and in Chapter 5 of the EIS), as well as flora and vegetation studies in the Project's area of influence (EIS, Chapter 5).

These studies contain information compiled in fieldwork campaigns conducted in Fall 2005, Spring 2006, November 2007, March 15 and 16, 2008, and September 2008, which add to the body of knowledge available regarding vegetation in these areas.

The Lo Encañado area shall be assigned a status of controlled access area for works contractors at all times: it shall not be subject to any intervention whatsoever. For more information on vegetation areas that could be affected by the construction works, and to learn about mitigation measures proposed by the Project Owner, you are advised to review Annex 42 of the EIS and Annex 6 of the Addendum.

With regard to environmental regulations that apply specifically to vegetation and plant life, the Project Owner shall be subject to: **Supreme Decree 366** (Exploitation of Tamarugo, Carob, Chañar, Guayacán, Aextoxicon, Charcoal, Acacia, Boldo, Maiten, Litre, Bollen, and Quillay). This legal instrument governs the felling of trees and bushes.

Supreme Decree 4363 and D.L 701 (Approving the Definitive Text of the Law on Woodland and

Regulations on Forest Promotion).

Article 2 of the Woodland Law establishes an obligation that land classified as for

preferential woodland land use, as well as natural and artificial woodlands, are subject to woodland management plans approved by the National Forestry Commission (CONAF). Furthermore, the Article 21 of Decree Law 701 establishes that any felling or usage of native woodland shall be subject to the CONAF's prior approval of the corresponding management plan.

Decree 82 (Prohibiting the Felling of Trees and Bushes in Indicated Andean High Mountain and Foothill Areas)

Article 102 Sector Environmental Permit (Permit for the felling or exploitation of native woodland, in any type of land, or plantations located in land with preferential characteristics for woodland use).

For further information and analysis on the aforementioned regulations and permits, as applicable to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see Sections 3.2.6 and 3.3.7 in Chapter 3 of the EIS.

Remark N° 436

3. ENVIRONMENTAL COMPONENT: FLORA AND FAUNA

- 3.1 With regard to the felling of over 3000 specimens of Frangel or Olivillo as a result of the extension of the Aucayes Stream road by more than 8 km, it is considered that the Felling Management and Reforestation Plan presented is absolutely invalid, as this plan should be presented to and signed by the owner of the property to be subject to intervention - in this case, the Ministry of Public Goods. The reduction in population density of Frangel trees - a vulnerable species of high biological value - is once again in clear contravention of the requirements set forth in the Regional Biodiversity Conservation Strategy and the Andean Santiago Action Plan, where this species is listed as a priority species for conservation. This situation also applies to the Guayacán, as more than 500 specimens of this species are to be felled. The Project Owner is requested to explain how it will comply with Ministry of Agriculture Decrees 82 and 366 and to clarify the situation and the presentation of the Felling Management and Reforestation Plan to CONAF, and to explain how the Ministry of Public Goods has agreed to sign this management plan. The Project Owner only accredits a reforestation acceptance letter from the Army, which administers the Colorado River land holding. This does not constitute acceptance by National Goods regarding the letter on protected plant life.
- 3.2 With regard to the sclerophyllous woodland present around the Colorado River and the Aucayes Stream, the Project Owner is requested to clarify whether species are present that could be more severely affected by a decline in flow rates, particularly those that are found in damper areas.

Thematic responses

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neoporteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Lilolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopus cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

Remark N° 437**Set of requests from the Rio Colorado****Community**

1. Electrical energy in both communities (Alfalfal and Maitenes).
2. Drinking water network, fire control network, and sewerage network.
3. Legal advisory services to gain ownership titles over homes and properties.
4. Scholarships for higher education (institutes or university) and employment training for young people leaving school.
5. Repair to perimeter fencing for channels one and two, preventing continual loss of animals that fall into the channels; or compensation for livestock owners affected by such losses. Repair and cleaning of the tailrace channel, which currently lacks protection on the slopes facing the settlement of Maitenes.
6. Riverside flood erosion protection in areas near the settlement of Alfalfal.
Riverside flood erosion protection on the banks of the Aucayes Stream in Maitenes.
7. Advances: paving of the access roads to the settlements of Alfalfal and Maitenes.
 - * Repair and renovation of community meeting halls.
 - * Water and power for the Alfalfal and Maitenes meeting halls.
 - * Bus stops with roofs, for schoolchildren waiting for the bus.
 - * Speed humps in Maitenes to control traffic speed.
8. Sports complex, including: Roofed multi-purpose sports hall in Alfalfal. Football pitch with changing rooms, roofed multi-purpose sports hall, area for traditional Chilean rodeos, picnic area - all of these with power and drinking water supplies.
9. Access control barrier, with no limitations affecting local livestock herders.
10. Landline phone connection for internet in Alfalfal and Maitenes.
11. Periodic exclusive public transport for community members approximately twice per week.
12. Nursery for children younger than school age.

Thematic responses**OTR Other**

This section relates to certain special situations that could not be categorized, or that are linked to specific requests, disqualifications, or situations that feature a clear political component, against either the environmental authority or the Project Owner.

OTR.01 Requests

Remark N° 438

According to remarks made in a communication from the Agriculture and Livestock Service, indicating that the EIS "recognizes that the mass stoppage effect (Annex 17 p. 19) could lead to irrigation supply outages of up to 9 hours, which may affect irrigation shifts", it is deemed necessary for the Project Owner to specify the means whereby the project's impact on the natural hydrological dynamics of the Maipo River will be minimized - particularly clarifying how water flows captured will be regulated and used for hydroelectric power generation. This operation may affect the return of water to the river, in terms of suitable timing and sufficient quantities of water for the holders of continuous, permanent end user water rights located downstream of the point where water is returned to the river. Members of our Association consider it vital that the project description must incorporate this issue, so as to ensure that current natural hydrological conditions in the Maipo River at the La Sirena Channel intake are not affected; if they are altered by the Project, suitable mitigation measures should be incorporated, applying to both to periods while the project's power plants are operational and to plant down time.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4 in Chapter 2 of the EIS**.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **PRO The Project**

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly

frequented, minimizing their visual impact.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1)

Chapter 3 of the EIS provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

PRO.01.01 Compensation

The concept of compensation refers to the act of indemnifying damages or harm caused.

Within the framework of the EIS, the Project Owner has issued a proposal to the competent authority regarding a suite of environmental management measures aiming to minimize, compensate, and restore the Project's impacts, making their implementation sustainable (Chapter 6 of the EIS).

In this regard, compensation is understood to be included in the spirit or end goal of the

environmental management measures proposed by the Project Owner, following the evaluation of the direct and indirect effects of the PHAM on each of the environmental components stipulated in Supreme Decree 95, SEIA Regulations.

Remark N° 439

For its part, the report issued by the Ministry of Public Works' Hydraulic Works Department indicates that the reduction in flow rates may lead to a reduction in sediment transport capacity, as against the current situation. This effect is exacerbated by the sudden increase in sediment transport capacity in the Maipo River downstream of the discharge point. These situations may lead to a sedimentation imbalance in the Maipo River - an issue that is not addressed in Gener's study. Similarly, the study does not indicate the length of the Maipo River that will be affected by the project. The potential effects of this imbalance are of particular concern to this Association, as they may affect the operation and stability of our intake - as 65 m³/s of water will be returned to the river approximately 1000 meters upstream of our intake, which is located in the El Canelo area, in the district of San José de Maipo.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4 in Chapter 2 of the EIS**.

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y

on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998). As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity. It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence. Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area. The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (AGU.06.01), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity. Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence. Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted. It can be concluded that the Maipo River system can be managed such that, with the project operations, present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them. Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

AGU.06.04 Discharge effects

Water capture in advance of in-situ gravel removal leads first to a reduction in sediment load in water carried through the headworks to the turbine rooms, while the solid materials that is retained is returned to the river. At the point where water is discharged from the plants (Las Lajas area), water that has passed through the turbines - which contains a certain quantity of sediment - once again mixes with the water in the rivers, returning to its original conditions in terms of average sediment load (**Addendum, Section I, Question 28**). At the point where water is returned to the Maipo River, in the Las Lajas area, there will be no degradation of the riverbed as it is composed entirely of rocks. It should be mentioned that the flow rate discharged from the PHAM at this point is always lower than the flow rate in the Maipo River just upstream. During the operations phase of the Project, planned maintenance activities do not include any cleaning of tunnels and culverts. Inside the tunnels, the cross sectional area for water flow is small enough to prevent sedimentation. This is shown through the operation of the Alfalfal Plant for 20 years without any cleaning of the tunnels being included among maintenance activities. The only operations that lead to the discharge of sediment are the discharge of gravel traps at the inlets, and the flushing of the sandtraps, returning sediment to the river once a certain volume has built up within them. These operations are conducted intermittently and for short time periods (1 minute for sandtraps, 10 minutes for gravel traps), at variable frequency depending on the season. For more information see the **Addendum, Section IV, Question 3**.

Remark N° 440

The aforementioned study does not indicate how the holders of end user rights over the waters of the Maipo River will be compensated for damages that they suffer as a result of the filling of the project's tunnels and conduits. When the project is started up, all of the hydroelectric plants' conduits and headworks structures must be filled, using a considerable volume of water that is not quantified in the EIS, and which belongs to the holders of water rights pertaining to the Maipo River.

Thematic responses

AGU Water

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The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see **Table 2.3.4** in **Chapter 2 of the EIS.**

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall

construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.01.01 Compensation

The concept of compensation refers to the act of indemnifying damages or harm caused. Within the framework of the EIS, the Project Owner has issued a proposal to the competent authority regarding a suite of environmental management measures aiming to minimize, compensate, and restore the Project's impacts, making their implementation sustainable (Chapter 6 of the EIS).

In this regard, compensation is understood to be included in the spirit or end goal of the environmental management measures proposed by the Project Owner, following the evaluation of the direct and indirect effects of the PHAM on each of the environmental components stipulated in Supreme Decree 95, SEIA Regulations.

Remark N° 441

The Project Owner is requested to indicate the coordinates of the point where water will be returned to the Maipo River, indicating the datum used.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT

-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

Remark N° 1 Human and Social Environment Baseline

AES Gener draws a veil over the influence of the PHAM project in this area. It should call on studies validated by a renowned academic institution to assess the number of jobs to be lost due to effects caused by the Project. Please specify the number of jobs that would cease to be available in sectors such as tourism, aggregates, commerce, transport, and other associated areas, broken down by sector.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term

mutually beneficial relationships between the project and its surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**.

CAL.05 Promoting entrepreneurship
The company has agreed to use its **Fundación Maitenes** foundation to set aside an **annual fund over a 10 year period starting in 2010**, to support local residents who formulate tourism development business plans for implementation in the area. These projects will be financed through funds open for competitive tenders; submissions will be evaluated on their own merit by a council of community representatives, which will select which projects will be funded.

The initiative to be implemented by the Fundación Maitenes may be linked to projects in progress run by public institutions and services in the district, related to the two lines of action that the foundation has agreed to support. This linkage may help to strengthen state-run initiatives and foster sustainability over the course of time for the actions supported by the foundation, during the period in which the program is active.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.01 Jobs in the District

Local labor availability is estimated based on figures from the Labor Brokerage and Information Office. This information will be made available to construction contractors so that they can preferentially hire local workers. According to information compiled at the Project Office in San José de Maipo, the project has registered a total of 980 potential project workers, of whom 390 are unemployed, broken down as follows:

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The average project workforce during the construction phase (5 years) is estimated at 2000 persons, and during the Citizen Participation process the company has agreed to ensure that an average of at least 500 local persons will be on the payroll during the construction of the Project.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. In parallel, the study investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 2 Ethnographic Study

The Project Owner must present a serious and unbiased study addressing all social and economic productive activities undertaken in the Maipo Valley areas that would be directly or indirectly affected by the Project.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

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The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
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The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

CAL.02 Education

A goal of the Maitenes Foundation relates to education for children and young people against the backdrop of the natural environment (for more information on the goals and achievements of the Foundation, see Annex 26 of the EIS).

Gener firmly believes that contributions to the technical and vocational education and training of young people must keep sight of real employment possibilities. Therefore, as a first initiative it has earmarked resources for an education improvement project in the district, which will contribute to establishing education management for the restructuring of the school curriculum and professional technical capacity building, taking into account the features needed to boost local employability. Based on information and recommendations from this study, Gener, acting through the Maitenes Foundation, will undertake a Capacity Building for Employability Program fundamentally oriented towards those whose family, social, or economic situation has barred them from completing their education and training, or acquiring the skills needed in order to find work. **CAL.03 Sports and leisure areas**

In order to avoid the loss or modification of land usage patterns, changes in usage, or loss of income associated with potential reduction in perceptions of the value of the surrounding areas, in terms of the provision of leisure, tourism, education, and other related services, the Project has developed a suite of measures that aim to minimize its environmental impact, so as to preserve the features that lead to the high perception of value of the area among residents, visitors, and tourists. These measures include: installation of most works in underground settings, thus minimizing their visual impact; the preservation of ecological flow rates in rivers and streams; and revegetation and reforestation of affected areas.

Similarly, the Project has enacted a suite of further measures to minimize interference with traditional livestock industries, as well as tourism and mountain/river sports.

In this way, the Project has taken all steps necessary in order to mitigate impacts on the environment, which will allow the area to retain the characteristics that make it so attractive for open-air education, tourism, and leisure activities. This will allow the project to operate alongside existing activities conducted in this area.

A wide-ranging suite of monitoring activities will be implemented to verify the effectiveness of the environmental measures (for more information, see **Chapter 8 of the EIS**). In parallel, and in order to verify that the Project does not affect cultural land usage patterns, applicable indices will be included for monitoring under the Social Indicator Monitoring (SIM) program.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **CAL.05 Promoting entrepreneurship**

The company has agreed to use its **Fundación Maitenes** foundation to set aside an **annual fund over a 10 year period starting in 2010**, to support local residents who formulate tourism development business plans for implementation in the area. These projects will be financed through funds open for competitive tenders; submissions will be evaluated on their own merit by a council of community representatives, which will select which projects will be funded.

The initiative to be implemented by the Fundación Maitenes may be linked to projects in progress run by public institutions and services in the district, related to the two lines of action that the foundation has agreed to support. This linkage may help to strengthen state-run initiatives and foster sustainability over the course of time for the actions supported by the foundation, during the period in which the program is active.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

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A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. In parallel, the study investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 3 Impact on Residents

The Project Owner must provide the local community with concrete guarantees regarding employ opportunities to be made available for those who are out of work or looking for better jobs, backing up these guarantees with legally valid documentation.

Thematic responses

Specific response

The Project Owner is unable to provide guarantees of employability, given that:

1. hiring activities will be undertaken by the works contractors
2. the suitability of each applicant must be assessed by the corresponding contracting party, in accordance with its requirements

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.01 Jobs in the District

Local labor availability is estimated based on figures from the Labor Brokerage and Information Office. This information will be made available to construction contractors so that they can preferentially hire local workers. According to information compiled at the Project Office in San José de Maipo, the project has registered a total of 980 potential project workers, of whom 390 are unemployed, broken down as follows:

Mine workers:	105
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Graduate professionals:	20
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Other, misc.:	139

The average project workforce during the construction phase (5 years) is estimated at 2000 persons, and during the Citizen Participation process the company has agreed to ensure that an average of at least 500 local persons will be on the payroll during the construction of the Project.

SOC.01.01 Requirements

In view of the characteristics and scale of the Project, personnel with specific qualifications will be required for the operation and maintenance of plant machinery and equipment, during the operations phase. Conversely, during the Project Construction Phase, it is projected that labor requirements will create jobs not only for mining workers, but also for machinery operators, drivers, and both skilled and unskilled construction personnel, the latter working mainly as day laborers and assistants.

The population of the Project's area of direct influence has been found to possess levels of training and specialization (occupation as defined under the CIU code) that shall permit them to access both skilled and unskilled work positions created by the Project.

Remark N° 4 Labor

The Project Owner should describe the types of position to be filled by local residents, indicating quality and quantity broken down by age, sex, type of qualifications, and job requirements. In particular, please specify the quantity and type of employment to be made available to young people in the area, and the quantity and type of employment to be made available to women heads of households.

In line with this breakdown, the Project Owner should also specify the start date and exact duration of employment to be provided.

Thematic responses

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

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The population of the Project's area of direct influence has been found to possess levels of training and specialization (occupation as defined under the CIIU code) that shall permit them to access both skilled and unskilled work positions created by the Project.

SOC.01.02 Working conditions

To date no schedule exists specifying labor requirements for the full duration of the construction phase. Detailed information specifying jobs created under average and peak labor requirements, broken down by labor requirement dynamics for each encampment, will only be available once the Project Owner has tendered the works contracts.

During the operations phase, it is expected that personnel requirements will amount to approximately 80 positions available, required for power plant operations and maintenance activities. Unlike work positions created during the construction phase, the jobs created in the operations phase will be permanent (EIS, Chapter 6, Section 6.4.2.4).

The Project Owner will provide for coordination between the construction works contractors, the Labor Brokerage Office, and the Municipality of San José de Maipo, regarding local labor required and jobs sought. The PHAM has accepted a commitment to incentivize works contractors to prioritize local contracting of labor required.

No prior training is planned in advance of the Construction Phase. However, such training will form part of the programs implemented in the more advanced phases of the project.

Remark N° 5 Impact on Production Activities and Users of Sanitary Services

Imbalance in the sedimentological dynamics of the Maipo River caused by the Project brings about a risk affecting a wide range of production activities and users in the Metropolitan Region, such as: sand producers, irrigation users, the Ministry of Public Works, and the company Aguas Andinas.

Thematic responses

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López and Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.03 Maipo River Sand Production

With regard to the extraction of aggregates in the Maipo River, during the operations phase of the PHAM, the Project will not modify current natural sediment (aggregates) transport dynamics occurring in the river.

In effect, under the natural dynamics, sediment transport takes place mainly in the months of November, December, and January, as a result of snow and ice melt in the high mountains, and it is during this season that variations in

flow rate in the Maipo River caused by the project stand at their lowest levels. The same behavior applies to winter season rises in river level.

It must be pointed out that the PHAM returns water to the Maipo River in the Las Lajas area, located upstream of the El Canelo zone, and therefore downstream of this point the river's flow dynamics with the project shall be identical to those currently observed.

It is of great importance to observe that currently, without the PHAM in operation, slightly downstream of the Las Vertientes area (in the La Obra stretch of the river), during certain times of the year flow rate in the Maipo River watercourse drops significantly, leaving the river bed dry, due to water abstraction at the following intakes: La Sirena Channel, San Carlos Channel, Independent Intake owned by Aguas Andinas, etc.

Average water abstraction flow rates attributable to the main drinking water and irrigation intakes, many of which also make use of hydroelectric power as a byproduct, but discounting the effects of existing hydroelectric plants on these channels that discharge directly into the intakes, amounts to 113 m³/second, which is equal to the average annual flow rate in the Maipo River at Las Vertientes. Depending on water availability, the annual

abstraction rate at these intakes varies between 78 and 164 m³/second.
This situation clearly explains the high level of perturbation observed in the behavior

of the Maipo River watercourse downstream of Las Vertientes, where the riverbed is dry except during periods of increased water level and in unusually wet years.

It is for this reason that the Project Owner asserts that its activities will have no impact on the current situation in the sand extraction sites located on the Maipo River.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service.

Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. The study also investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 6 Impact on Production Activities: Tourism

The Project is designed to minimize impact on tourism infrastructure, with point classifications and in relation with highway-related issues. This activity's real-world contribution to the District must be identified, along with the way in which it will be affected by reductions in flow rates, damage to ecosystems, access to mountain areas, impact on the landscape from power transmission lines.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally

complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's

high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **ELE Electrical Installations**

The electrical installations presented in the EIS comprise the substation, to be located in the El Sauce area, the characteristics of which are to be found in **Annex 27 of the EIS**; given that the electricity transport layout (cabling and towers) is to be presented to the Environmental Impact Assessment System once all background information is available.

ELE.03 Transmission lines

In view of the project's location, close to Santiago, it is expected that the distance covered by the definitive cabling layout will be short, involving a minimum of sectors not subject to prior intervention. With regard to the specific location of the cabling layout, plans call for the use of the existing high tension power line used by the Queltehues, Volcán, and Maitenes Plants.

Once the layout of the high tension power line has been defined, the Project Owner will submit this plan to the Environmental Impact Assessment System, in accordance with legislation in force. In line with the development of the Compliance Plan for environmental legislation applicable to the Project, the General Regulations applicable in this instance are indicated below:

Decree with Force of Law N°4, dated 05 February, 2007, setting forth the Recast, Coordinated, and Systematized Text of the General Law on Electrical Services.

The General Law on Electrical Services governs the generation, transmission, distribution, and regimen of concessions and tariffs applicable to electrical energy, and the functions of the State with regard to these areas.

Supreme Decree N° 327, Regulations Regarding the General Law on Electrical Services

The Regulations Regarding the General Law on Electrical Services establish, in their 8th Article, that hydroelectric power plants, electrical substations, and transmission lines may be installed without making a request for a concession, when the interested party wishes. These concessions may be provisional (in order to study projects) or definitive. A definitive concession is granted by a supreme decree issued by the Ministry of the Economy, by order of the President of the Republic. Permits relating to electrical installations that do not require concessions are granted by the corresponding Municipal Governments.

For further information and analysis on the aforementioned regulations, with regard to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see **Sections 3.1.6 and 3.1.7 of Chapter 3 of the EIS**, where more detailed versions of this information can be found.

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3**, and **Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neopteris curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Liolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed

will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor.

(see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

TUR Tourism

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.01 River sports

During the operations phase, the activities of the PHAM shall not directly or indirectly interfere with tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. Furthermore, the PHAM shall have no significant effect on boating activities on the Maipo River as a result of reductions in river flow rate; an analysis is presented in Annex 17 of the Addendum modeling a number of hydrological scenarios (1), concluding that the PHAM shall not affect the current situation in rafting and kayaking activities conducted in the area between San Gabriel and San José de Maipo.

In order to establish an analysis comparing the current Maipo River boating situation with predictions for the situation with the Project operational, the variables of flow rate, river width, and water depth were modeled, as valid indices to establish conditions for boating activities on the Maipo River.

This analysis showed that the Project shall not interfere with tourism activities conducted on the Maipo River, in view of estimates that in a dry year, the magnitude of variations in flow rate and water depth will not cause interference with boating activities.

For more information, see **Annex 17 of Addendum 1**.

- (1) The hydrological analysis used to evaluate reductions in flow rate is based on a statistical record going back 50 years, thus ensuring that seasonal and annual variations are incorporated into the analyses conducted.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector.

This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

TUR.03 Visual impact

The Project Owner has conducted a study to characterize the landscape of the area in which

the Project is to be located, taking into account esthetic and perceptual considerations and emphasizing the characterization and appraisal of the issues of visibility, quality, and visual fragility of the landscape.

In terms of Landscape Alteration or Landscape Impact associated with this infrastructure project, potential effects are classified as either limited duration - generally applying during the construction phase - or permanent, for effects that shall persist during the operations phase and continue throughout the working life of the Project. A qualitative methodology is used to study these effects, whereby the first phase consists of identifying sources of visual impact, and the second phase relates to identifying and classifying environmental impacts.

As a general rule, it is assumed that impact on the landscape during the construction phase shall be temporary, mainly due to the transitory nature of the sources of impact, the low level of prior human activity in certain areas, and the relatively low level of physical and visual accessibility of a significant proportion of the area subject to intervention.

As most of the Project construction works will be situated underground, during the operations phase the main visual signatures of its existence will be the intakes and access roads.

For further information on the methodology used for landscape impact assessment, see **Chapter 6, Section 6.1.4.10 of the EIS, and Annex 17 of Addendum 1.**

Remark N° 7

Impact on Production Activities: Tourism

What plans exist for the mitigation of the impact that the Project shall cause for tourists during the operations phase, through increases in journey times or increased waiting periods at intersections? The project owner should calculate the percentage of Santiago residents who regularly visit the Maipo Valley and who shall stop visiting as a result of annoyances caused by the Project.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents.**

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19.**

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1.** The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS.**

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayes, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions.

The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS.**

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in

these areas, demonstrating that no interference will arise, due mainly

to the following factors:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

VIA.03 Congestion

When PHAM Project construction activities begin, there will be an increase in road traffic movements in the immediate surroundings of the work area. This vehicle movement will be related mainly to the transport of supplies and machinery to the works installations, transport of excavation spoil to muck deposition sites, and, to a lesser extent, the transport of personnel to the work sites. For more information on traffic flow increases resulting from the Project, see **Chapter 2, section 2.4.1, part E, Annex 14 of the EIS, and Annexes 9 and 14 of Addendum 1.**

The PHAM highway impact analysis takes into account all works and activities under the Project, including the transport of supplies, machinery, and personnel. According to modeling studies, it is predicted that there will be no significant impact on highway usage (levels of saturation of new and existing roads and intersections). For more information on the Project's road operations, measurements used and models derived, see **Annexes 9 and 15 of the Addendum.**

Additionally, increases in noise emissions are analyzed in **Section 6.4.1.2 of the EIS.**

Notwithstanding the above, it is assumed that, given that certain construction activities shall be conducted at the same times that other road users wish to make use of certain sections of specific roads, a certain level of annoyance may be caused, and for this reason the PHAM has adopted a number of control and mitigation measures, indicated in **Chapters 6 and 2 of the EIS** and in **Annex 14 of the EIS, as well as Annexes 9 and 17 of Addendum 1.**

It is considered likely that, in view of the predominance of the tourist industry in the local economy of the district of the Maipo Valley, a certain level of annoyance may be caused at certain points and at specific moments, mainly due to conflicts between PHAM road usage and the movements of visitors. As indicated in the EIS Baseline Study, this is an area where tourists come to enjoy walks and peace and quiet, on weekends and holidays. In particular, there are 2 specific tourism attractions located in the same areas as site installations: the El Yeso and the Alto Volcán area, where special measures shall be taken, as specified in **Chapter 6 of the Project EIS.** Additionally, **Annex 32 of the EIS** specifies emergency procedures to be adopted in the event of transport accidents caused by project vehicles.

Remark N° 8 Mitigation, Restoration, and Compensation Measures

What concrete social benefits will AES Gener contribute to the local community, given that it shall make commercial use of the valley's water and landscape resources? Indicate direct benefits in the fields of health, housing, and education.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

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Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

CAL.02 Education

A goal of the Maitenes Foundation relates to education for children and young people against the backdrop of the natural environment (for more information on the goals and achievements of the Foundation, see Annex 26 of the EIS).

Gener firmly believes that contributions to the technical and vocational education and training of young people must keep sight of real employment possibilities. Therefore, as a first initiative it has earmarked resources for an education improvement project in the district, which will contribute to establishing education management for the restructuring of the school curriculum and professional technical capacity building, taking into account the features needed to boost local employability. Based on information and recommendations from this study, Gener, acting through the Maitenes Foundation, will undertake a Capacity Building for Employability Program fundamentally oriented towards those whose family, social, or economic situation has barred them from completing their education and training, or acquiring the skills needed in order to find work. **CAL.03 Sports and leisure areas**

In order to avoid the loss or modification of land usage patterns, changes in usage, or loss of income associated with potential reduction in perceptions of the value of the surrounding areas, in terms of the provision of leisure, tourism, education, and other related services, the Project has developed a suite of measures that aim to minimize its environmental impact, so as to preserve the features that lead to the high perception of value of the area among residents, visitors, and tourists. These measures include: installation of most works in underground settings, thus minimizing their visual impact; the preservation of ecological flow rates in rivers and streams; and revegetation and reforestation of affected areas.

Similarly, the Project has enacted a suite of further measures to minimize interference with traditional livestock industries, as well as tourism and mountain/river sports.

In this way, the Project has taken all steps necessary in order to mitigate impacts on the environment, which will allow the area to retain the characteristics that make it so attractive for open-air education, tourism, and leisure activities. This will allow the project to operate alongside existing activities conducted in this area.

A wide-ranging suite of monitoring activities will be implemented to verify the effectiveness of the environmental measures (for more information, see **Chapter 8 of the EIS**). In parallel, and in order to verify that the Project does not affect cultural land usage patterns, applicable indices will be included for monitoring under the Social Indicator Monitoring (SIM) program.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **CAL.05 Promoting entrepreneurship**

The company has agreed to use its **Fundación Maitenes** foundation to set aside an **annual fund over a 10 year period starting in 2010**, to support local residents who formulate tourism development business plans for implementation in the area. These projects will be financed through funds open for competitive tenders; submissions will be evaluated on their own merit by a council of community representatives, which will select which projects will be funded.

The initiative to be implemented by the Fundación Maitenes may be linked to projects in progress run by public institutions and services in the district, related to the two lines of action that the foundation has agreed to support. This linkage may help to strengthen state-run initiatives and foster sustainability over the course of time for the actions supported by the foundation, during the period in which the program is active.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

**SOC.01 Jobs in the
District**

Local labor availability is estimated based on figures from the Labor Brokerage and Information Office. This information will be made available to construction contractors so that they can preferentially hire local workers. According to information compiled at the Project Office in San José de Maipo, the project has registered a total of 980 potential project workers, of whom 390 are unemployed, broken down as follows:

Mine workers:	105
Carpenters, Builders, and Rebar Layers:	157
Heavy Machinery Operators:	131
Non-specialized day laborers:	39
Drivers:	87
Specialized technical personnel:	60
Welders:	26
Foremen and supervisors:	7
Graduate professionals:	20
Cleaning, security, and canteen workers:	120
Administrative personnel:	91
Other, misc.:	139

The average project workforce during the construction phase (5 years) is estimated at 2000 persons, and during the Citizen Participation process the company has agreed to ensure that an average of at least 500 local persons will be on the payroll during the construction of the Project.

Remark N° 9 Mitigation, Restoration, and Compensation Measures

The provision of a shameful and insufficient annual fund of US\$ 200,000 over a 10 year period starting in 2010, allocated through the Maitenes Foundation, does not resolve any of the Valley's social problems; and nor does it contribute to the mitigation of the company's immense historic debt to the district.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

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This commitment will apply only if the Alto Maipo Project is executed.

Remark N° 10 Environmental Monitoring

What is the objective of the Operations Phase Social Indicator Monitoring Program? In what way will it benefit the local community? Why will it be implemented for only 5 years, when the impact of the Project may continue for decades? What indicators will be used to measure the impact of the Project, if baseline information is insufficient in this regard? What institution will provide guarantees that this study is independent and serious?

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

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Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. Details are provided regarding the principal characteristics of

this program in **Chapter 8, Section 8.2.7 of the EIS**, and in **Annex 39 of the EIS**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

OTR Other

This section relates to certain special situations that could not be categorized, or that are linked to specific requests, disqualifications, or situations that feature a clear political component, against either the environmental authority or the Project Owner.

OTR.02 CONAMA

Remark N° 11
Upper Maipo Basin Area Usage Flow Rate

The company shall not benefit the development of services currently provided in the district (lodging, food, commerce, transport). The encampments and the contractor companies will contract services outside of the district.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

CAL.05 Promoting entrepreneurship

The company has agreed to use its **Fundación Maitenes** foundation to set aside an **annual fund over a 10 year period starting in 2010**, to support local residents who formulate tourism development business plans for implementation in the area. These projects will be financed through funds open for competitive tenders; submissions will be evaluated on their own merit by a council of community representatives, which will select which projects will be funded.

The initiative to be implemented by the Fundación Maitenes may be linked to projects in progress run by public institutions and services in the district, related to the two lines of action that the foundation has agreed to support. This linkage may help to strengthen state-run initiatives and foster sustainability over the course of time for the actions supported by the foundation, during the period in which the program is active.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.01 Jobs in the District

Local labor availability is estimated based on figures from the Labor Brokerage and Information Office. This information will be made available to construction contractors so that they can preferentially hire local workers. According to information compiled at the Project Office in San José de Maipo, the project has registered a total of 980 potential project workers, of whom 390 are unemployed, broken down as follows:

Mine workers:	105
Carpenters, Builders, and Rebar Layers:	157
Heavy Machinery Operators:	131
Non-specialized day laborers:	39
Drivers:	87
Specialized technical personnel:	60
Welders:	26
Foremen and supervisors:	7
Graduate professionals:	20
Cleaning, security, and canteen workers:	120
Administrative personnel:	91
Other, misc.:	139

The average project workforce during the construction phase (5 years) is estimated at 2000 persons, and during the Citizen Participation process the company has agreed to ensure that an average of at least 500 local persons will be on the payroll during the construction of the Project.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. In parallel, the study investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 12 1. Water Rights

The Project does not hold concessions for water rights at any abstraction point. A technical report exists, issued by the DGA, that concludes that it would not be possible to make available the water rights requested by Gener because there is no physical availability of water. How can a project of this nature be evaluated if it does not hold the required water rights? Will the Project attempt to take over water rights held by third parties?

Furthermore, a vast number of complaints have been lodged opposing these transfers of rights, in the Upper Maipo area and in the Colorado River, by private individuals, neighborhood groups, irrigation channel user associations, and the company Aguas Andinas.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS**.

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in **Chapter 2 of the EIS**.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

Remark N° 13 2. Baseline Study

Given that the project does not hold the water rights that it hopes to use, and that should such rights be granted, the flow rates conceded are as yet unknown, the baseline study is not valid because it is based on suppositions regarding flow rates.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of the power plants requires an

ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 14

3. Upper Maipo Basin Area Usage Flow Rate

The Project plans establish a total water abstraction rate in the Upper Maipo Basin area of 27 m³/s. It is not made clear from where this flow rate will be abstracted, given that the maximum statistical monthly average for flow rate in the Yeso River is approximately 11 m³/s. The question is: Does the project plan to make any intervention directly affecting the El Yeso Reservoir?.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.05 Drinking water supply

Construction works and/or activities involved in the project (roads, movement of materials, transport of different products, etc) shall have no effect or impact whatsoever on the quality or security/safety of water supply in the Maipo River system. During the construction phase, Project interventions affecting watercourses shall cause only temporary effects resulting from Earth moving during excavation and other construction activities. This intervention shall affect small areas over short time periods, as it shall last only during the period while these installations are under construction (see **Section 6.4.1.4 of the EIS and Section VII, Question 17, in the Addendum**).

During operations, the PHAM shall not affect the Laguna Negra-Lo Encañado and El Yeso

Reservoir system, which is managed by the company Aguas Andinas S.A, in its capacity as holder of the drinking water concession for Santiago; nor shall the Project affect the operational dynamics of the drinking water supply system. Therefore, the implementation of the PHAM does not imply any impact whatsoever on the supply of drinking water (see **Section I, responses 27 and 29, in the Addendum**).

Furthermore, the water abstracted by the Project shall be returned to the river 5 km upstream of the

Toma Independiente or Independent Intake, operated by the company Aguas Andinas S.A., which abstracts water for drinking water supply to the city of Santiago; therefore, the PHAM shall not affect normal operations of this system. The PHAM shall only affect the delivery point of water in the tributaries of the Maipo River; in other words, water that currently does not drain into the Maipo River shall not be incorporated into that river's total flow.

However, in the event that an incident may arise as a result of an accident during construction, such as accidental spillages or rock falls, the procedures described in the Contingency Plan shall be implemented, consisting of a suite of actions to solve associated problems. This plan is explained in detail in **Chapter 7 of the EIS, Section 7.2.5**.

AGU.05.01 Drinking water quality

The process of hydroelectric power generation does not affect the physical/chemical qualities of water. Additionally, the PHAM does not plan to implement regulation installations that retain sediment. Thirdly, downstream of the discharge point the natural river conditions are maintained with regard to flow rate and physical/chemical properties.

During the construction of installations to be located in watercourses, the free-flowing course of the river is maintained through the construction of diversions through pipes laid along the river course for such purposes, or through channels that divert all flow, allowing free water circulation with no effect whatsoever on quality (see **Section I, Question 28, in the Addendum**).

The Project owner shall not make use of the Lo Encañado Lake or water usage rights owned by Aguas Andinas S.A. for this Project, instead opting to forgo usage of these resources and to replace the role that would have been fulfilled by the Lo Encañado Lake with a forebay located on a widening of the Alfalfa II plant headworks, located in the Alto Aucayes area on the Colorado River Valley (for details, see **EIS 2.2.1**). The Lo Encañado area shall be assigned a status of controlled access area at all times: it shall not be subject to any intervention whatsoever.

The Project Owner has made available a Water Quality Monitoring Program, with specifications for application during both the construction and operations phases. This program espouses a commitment to verify the effectiveness of environmental control measures designed to minimize the effects of works construction activities during the construction phase.

For further information on the Monitoring Program, see **Sections 8.2 and 8.3** in **Chapter 8 of the EIS**.

Remark N° 15

4. Ecological Flow Rates and Baseline Studies

The Project establishes an ecological flow rate for the Colorado River at 0.6 m³/s. This flow rate is outside of the bounds stipulated in the DGA Manual of Regulations and Procedures, which specifies that the value must be 10% of average annual flow rate - in this case, 3.1 m³/s plus environmental demand.

Our studies indicate that downstream of the intakes, the Yeso River dries out, the La Engorda Stream dries out, the Colina Stream dries out, the Las Placas Stream dries out, the Morado Stream dries out, and the Colorado River is left with a minimal flow rate. The ecological flow rates defined at the exits of the intakes will soak into the ground and not flow along the watercourses in question to their points of confluence with more major rivers, leaving them dry.

Ecological flow rates are determined based on the Environment Law, Law 19,300 and respecting the rights of third parties.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4 in Chapter 2 of the EIS**.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17 of the Addendum**.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to

intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams. It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Q_e) approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	Rain gauge station		
	406,157		
	Stream gauge station		
	6,259,100		
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 16

5. Impact on Sediments and Aggregates

The Project documentation itself states, in Annex 20, that potential aggregates production in the river basin will decline by around 3 million tons per year, which equates to more than 22% of total. This will affect the infrastructure of intakes, bridges, and water abstraction works, as well as the specific activity of aggregates extraction. If the authority has imposed a freeze on aggregates extraction permits in the first section of the Maipo River, how can it grant permission for a project that will extract 22% of all aggregates produced in the river basin?

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (**AGU.06.01**), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence. Watercourse degradation problems and effects on certain

highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted..

It can be concluded that the Maipo River system can be managed such that, With the Project operational , present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them.

Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

AGU.06.03 Maipo River Sand Production

With regard to the extraction of aggregates in the Maipo River, during the operations phase of the PHAM, the Project will not modify current natural sediment (aggregates) transport dynamics occurring in the river.

In effect, under the natural dynamics, sediment transport takes place mainly in the months of November, December, and January, as a result of snow and ice melt in the high mountains, and it is during this season that variations in

flow rate in the Maipo River caused by the project stand at their lowest levels. The same behavior applies to winter season rises in river level.

It must be pointed out that the PHAM returns water to the Maipo River in the Las Lajas area, located upstream of the El Canelo zone, and therefore downstream of this point the river's flow dynamics with the project shall be identical to those currently observed.

It is of great importance to observe that currently, without the PHAM in operation, slightly downstream of the Las Vertientes area (in the La Obra stretch of the river), during certain times of the year flow rate in the Maipo River watercourse drops significantly, leaving the river bed dry, due to water abstraction at the following intakes: La Sirena Channel, San Carlos Channel, Independent Intake owned by Aguas Andinas, etc.

Average water abstraction flow rates attributable to the main drinking water and irrigation intakes, many of which also make use of hydroelectric power as a byproduct, but discounting the effects of existing hydroelectric plants on these channels that discharge directly into the intakes, amounts to 113 m³/second, which is equal to the average annual flow rate in the Maipo River at Las Vertientes. Depending on water availability, the annual abstraction rate at these intakes varies between 78 and 164 m³/second.

This situation clearly explains the high level of perturbation observed in the behavior of the Maipo River watercourse downstream of Las Vertientes, where the riverbed is dry except during periods of increased water level and in unusually wet years.

It is for this reason that the Project Owner asserts that its activities will have no impact on the current situation in the sand extraction sites located on the Maipo River.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. The study also investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 17

5. Real Available Water Resources

Baseline studies to define ecological flow rates, taking into account the geology, local soil studies, and impact on flora and fauna, would certainly arrive at much lower figures for real available water resources than those presented. How much energy will this project really be able to generate?

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS**.

This section presents information characterizing the basins and tributaries of the Volcán, Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex

13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS**.

AGU.03.02 Geology

The baseline studies used in determining the geological characteristics of the Project area are presented in **Section 5.3.6 of the EIS**. Additionally, the **hydro-geological baseline studies** for the Project area are presented in **Section 5.3.5.3 of the EIS**. Complementary information is also provided in **Annex 45 of the EIS**.

Both of these studies start with general background information on the area where the Project is to be installed, going on to present a detailed description of the geological and geomorphological characteristics of specific areas where Project works or activities are planned.

Complementary information is provided in **Annex 8 of the Addendum**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to

intervention by means of a systematic characterization of the watercourses,

centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles,

70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neoporteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo Spinolosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Lilolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result,

populations of organisms consist mainly of introduced species (EIS 5.4.3).. For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

Remark N° 18

7. Impact on aquatic flora and fauna

The Project fails to identify the species that shall be affected by flow reductions in the El Volcán area sub-basin, and similarly fails to identify the conservation status and water and water-flow requirements of species identified.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS**.

This section presents information characterizing the basins and tributaries of the Volcán, Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex

13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS**.

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles,

70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed

frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of

installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neopterteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo Spinolosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Lilolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

Remark N° 19

8. Impacts on Meadows and Wetlands

The Project does not mention impacts that it will incur through the reduction of flow rates in water bodies, in high altitude wetlands and meadows located within the Project's area of influence. It should be borne in mind that as a consequence of the construction of the Alfalfal I Plant, which became operational in 1991, a number of meadows/wetlands dried out.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate

that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth,

flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

SUE.02 Soils, meadows, and wetlands

The Project Owner has conducted a number of studies with the aim of characterizing the vegetation of summer grazing areas (La Engorda) (see details in Addendum 1, Annex 6, and in Chapter 5 of the EIS), as well as flora and vegetation studies in the Project's area of influence (EIS, Chapter 5).

These studies contain information compiled in fieldwork campaigns conducted in Fall 2005, Spring 2006, November 2007, March 15 and 16, 2008, and September 2008, which add to the body of knowledge available regarding vegetation in these areas.

The Lo Encañado area shall be assigned a status of controlled access area for works contractors at all times: it shall not be subject to any intervention whatsoever. For more information on vegetation areas that could be affected by the construction works, and to learn about mitigation measures proposed by the Project Owner, you are advised to review Annex 42 of the EIS and Annex 6 of the Addendum.

With regard to environmental regulations that apply specifically to vegetation and plant life, the Project Owner shall be subject to:

Supreme Decree 366 (Exploitation of Tamarugo, Carob, Chañar, Guayacán, Aextoxicon, Charcoal, Acacia, Boldo, Maiten, Litre, Bollen, and Quillay). This legal instrument governs the felling of trees and bushes.

Supreme Decree 4363 and D.L 701 (Approving the Definitive Text of the Law on Woodland and Regulations on Forest Promotion).

Article 2 of the Woodland Law establishes an obligation that land classified as for preferential woodland land use, as well as natural and artificial woodlands, are subject to woodland management plans approved by the National Forestry Commission (CONAF). Furthermore, Article 21 of Decree Law 701 establishes that any felling or usage of native woodland shall be subject to the CONAF's prior approval of the corresponding management plan.

Decree 82 (Prohibiting the Felling of Trees and Bushes in Indicated Andean High Mountain and Foothill Areas)

Article 102 Sector Environmental Permit (Permit for the felling or exploitation of native woodland, in any type of land, or plantations located in land with preferential characteristics for woodland use).

For further information and analysis on the aforementioned regulations and permits, as applicable to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see Sections 3.2.6 and 3.3.7 in Chapter 3 of the EIS.

Remark N° 20

9. Sustainability in the Maipo River Basin

The Company does not hold the corresponding water rights, and the Baseline studies are therefore not valid.

The Project does not comply with the Environmental Impact Assessment System. The company does not recognize the impacts that shall arise as a result of the extraction of water resources.

The Project is not capable of generating 530 MW. Data studied indicate that the company does not possess the water resources necessary to operate the Project, and does not hold corresponding water rights.

The Gener PHAM Project is not compatible with the sustainability of the Maipo River Basin.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work.

For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

existing in the Project area.

This section presents information characterizing the basins and tributaries of the Volcán, Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex

13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not

commonly frequented, minimizing their visual impact.

Remark N° 21 Cultural Heritage

The Project shall affect sites of incalculable heritage value, and yet information is provided on only some of these sites, identified in the Baseline. Three areas are identified as featuring resources of cultural interest: Las Morrenas and Camino del Inka in the Lo Encañado Lake area, and the site known as Aucayes 1 in the Colorado River - Aucayes Stream area, as well as a site of paleontological interest as Alto Volcán.

What guarantees does the Project Owner provide to ensure that contractor companies respect this archeological and paleontological heritage? How many professionals will be tasked with providing training or monitoring of contractor companies? What legally-backed institution will monitor works and determine the significance of sites and remains discovered?

What institution will provide oversight in order to ensure legal minimal compliance? Contractual requirements affecting contractor companies are not sufficient.

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

AGU.01 Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum 1**.

ARQ.02 Values preservation

General paleontological protection measures:

i) **Restricted area applicable to contractor company employees**

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) **Delimitation of buffer zones**

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) **Contingency measures**

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) **Compensation measures**

- a) **production of cultural information material**
- b) **creation of a viewpoint**
- c) **fossil trail**

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

Remark N° 22 Definition of Baseline 1

Where plans call for the construction of roads, intakes, muck disposal heaps, temporary encampments, and other such sites, the company fails to recognize the existence of a site of immense paleontological value that is unique in Chile: 150 million year old dinosaur footprints. Under the protection granted under current legislation, this area should be protected and no commercial project that would affect it should be conducted. No information is available on such ichnofossils of this age in Chile, so studying them could yield a major contribution to Chilean and global paleontology. Law 17,288 Title I - Art. I and Title III Art. 10-12-13.

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

AGU.01 Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum 1**.

ARQ.02 Values preservation

General paleontological protection measures:

i) **Restricted area applicable to contractor company employees**

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) **Delimitation of buffer zones**

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) **Contingency measures**

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) **Compensation measures**

- production of cultural information material**
- creation of a viewpoint**
- fossil trail**

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be

implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

Remark N° 23 Definition of Baseline 2

The Project documentation omits information on the existence of geological structures that are unique in Chile and that are of incalculable value, which currently constitute an "open air museum" and that could be subject to irreparable damage through the construction of the PHAM. These formations include a number of types of mudcrack and raindrop structures with ages between 155 and 150 million years. A detailed survey should be conducted to document these features, and the area should then be given protected status due to the scientific value of these structures, which are unique in Chile.

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

AGU.01 Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum**.

ARQ.02 Values preservation

General paleontological protection measures:

i) **Restricted area applicable to contractor company employees**

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) **Delimitation of buffer zones**

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) **Contingency measures**

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) **Compensation measures**

- a) **production of cultural information material**
- b) **creation of a viewpoint**
- c) **fossil trail**

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

ARQ.03 Scientific research

The scientific and cultural importance of the paleontological resources present has been recognized by the PHAM project principal, leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the project principal has taken on a commitment to enhance knowledge of the area before starting planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may be detected during the course of construction under the PHAM. These activities will contribute not only to the

maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of materials or components present.

For more information, see **Annex 14** of **Addendum 1**.

Remark N° 24
Cultural Heritage
Regarding Law 17,288

The law establishes that FOSSILS AND THE SITES WHERE THEY ARE LOCATED ARE A NATIONAL MONUMENT without specifying differences between paleontological pieces depending on their importance to science. In this regard, there is a need to identify how criteria will be established for the classification of pieces according to their scientific significance, the institutions or persons who shall act as guarantors, and the legal backing for conducting surveys of the quality described - as these are actions that infringe legislations in force. Law 17,288 Title V Art. 21-22-23.

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

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The scientific and cultural importance of the paleontological resources present has been recognized by the PHAM project principal, leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the project principal has taken on a commitment to enhance knowledge of the area before starting planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may

be detected during the course of construction under the PHAM. These activities will contribute not only to the maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of materials or components present.

For more information, see **Annex 14 of Addendum 1**.

Remark N° 25

Measures for the Protection or Preservation of Paleontological Heritage Existing in the Project's Area of Influence

Interventions at fossil sites implies the loss of material that no **known mitigation measure can resolve**. The extraction of a part of the material that is visible causes the loss of many other parts that remain covered. The removal of pieces and their deposition in other areas takes them out of their original context and leaves them stripped of all scientific value. In this regard, the Project Owner must specify what measures it shall implement if it does not possess permits issued by the National Monuments Council, for how long it shall support these measures, and what institution(s) will vouch for them.

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

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iv) Compensation measures

- a) production of cultural information material
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- c) fossil trail

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

ARQ.03 Scientific research

The scientific and cultural importance of the paleontological resources present has been recognized by the PHAM project principal, leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the project principal has taken on a commitment to enhance knowledge of the area before starting planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may

be detected during the course of construction under the PHAM. These activities will contribute not only to the maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of materials or components present.

For more information, see **Annex 14** of **Addendum 1**.

Remark N° 26 Water Rights

The Project does not hold concessions for water rights at any abstraction point. A technical report exists, issued by the DGA, that concludes that it would not be possible to make available the water rights requested by Gener because there is no physical availability of water. How can a project of this nature be evaluated if it does not hold the required water rights? Will the Project attempt to take over water rights held by third parties?

Furthermore, a vast number of complaints have been lodged opposing these transfers of rights, in the Upper Maipo area and in the Colorado River, by private individuals, neighborhood groups, irrigation channel user associations, and the company Aguas Andinas.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS**.

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in **Chapter 2 of the EIS**.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

Remark N° 27 Baseline Study

Given that the project does not hold the water rights that it hopes to use, and that should such rights be granted, the flow rates conceded are as yet unknown, the baseline study is not valid because it is based on suppositions regarding flow rates.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS.**

This section presents information characterizing the basins and tributaries of the Volcán, Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This

characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex 13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS.**

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 28 Ecological Flow Rates and Baseline Studies

The Project establishes an ecological flow rate for the Colorado River at 0.6 m³/s. This flow rate is outside of the bounds stipulated in the DGA Manual of Regulations and Procedures, which specifies that the value must be 10% of average annual flow rate - in this case, 3.1 m³/s plus environmental demand.

Our studies indicate that downstream of the intakes, the Yeso River dries out, the La Engorda Stream dries out, the Colina Stream dries out, the Las Placas Stream dries out, the Morado Stream dries out, and the Colorado River is left with a minimal flow rate. The ecological flow rates defined at the exits of the intakes will soak into the ground and not flow along the watercourses in question to their points of confluence with more major rivers, leaving them dry.

Ecological flow rates are determined based on the Environment Law, Law 19,300 and respecting the rights of third parties.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4 in Chapter 2 of the EIS**.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17 of the Addendum**.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to

intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams. It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

AGU.04.04 Monitoring and control of flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Q_e) approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	Stream gauge station		
	406,157	6,259,100	
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 29

Impact on Sediments and Aggregates

The Project documentation itself states, in Annex 20, that potential aggregates production in the river basin will decline by around 3 million tons per year, which equates to more than 22% of total. This will affect the infrastructure of intakes, bridges, and water abstraction works, as well as the specific activity of aggregates extraction. If the authority has imposed a freeze on aggregates extraction permits in the first section of the Maipo River, how can it grant permission for a project that will extract 22% of all aggregates produced in the river basin?

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum.**

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (**AGU.06.01**), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence. Watercourse degradation problems and effects on certain

highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted..

It can be concluded that the Maipo River system can be managed such that, With the Project operational , present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them.

Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

AGU.06.03 Maipo River Sand Production

With regard to the extraction of aggregates in the Maipo River, during the operations phase of the PHAM, the Project will not modify current natural sediment (aggregates) transport dynamics occurring in the river.

In effect, under the natural dynamics, sediment transport takes place mainly in the months of November, December, and January, as a result of snow and ice melt in the high mountains, and it is during this season that variations in

flow rate in the Maipo River caused by the project stand at their lowest levels. The same behavior applies to winter season rises in river level.

It must be pointed out that the PHAM returns water to the Maipo River in the Las Lajas area, located upstream of the El Canelo zone, and therefore downstream of this point the river's flow dynamics with the project shall be identical to those currently observed.

It is of great importance to observe that currently, without the PHAM in operation, slightly downstream of the Las Vertientes area (in the La Obra stretch of the river), during certain times of the year flow rate in the Maipo River watercourse drops significantly, leaving the river bed dry, due to water abstraction at the following intakes: La Sirena Channel, San Carlos Channel, Independent Intake owned by Aguas Andinas, etc.

Average water abstraction flow rates attributable to the main drinking water and irrigation intakes, many of which also make use of hydroelectric power as a byproduct, but discounting the effects of existing hydroelectric plants on these channels that discharge directly into the intakes, amounts to 113 m³/second, which is equal to the average annual flow rate in the Maipo River at Las Vertientes. Depending on water availability, the annual abstraction rate at these intakes varies between 78 and 164 m³/second.

This situation clearly explains the high level of perturbation observed in the behavior of the Maipo River watercourse downstream of Las Vertientes, where the riverbed is dry except during periods of increased water level and in unusually wet years.

It is for this reason that the Project Owner asserts that its activities will have no impact on the current situation in the sand extraction sites located on the Maipo River.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. The study also investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 30 Climate Change

The PHAM does not recognize or mention climate change or global warming. It is known that temperatures will rise, precipitation will diminish, and sea levels will rise. The Project Owner should take these variables into account in its study.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.04 Monitoring and control of flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Q_e) approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum.**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
Alto Volcán	Stream gauge station	406,157	6,259,100
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán)		
Alto Volcán	Control Station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control Station	406,780	6,260,782

Alto Volcán	Las Placas Intake Control Station Colina Intake	407,181	6,260,081
Alto Volcán	Control Station El Morado Intake	405,768	6,261,231

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Yeso River	Rain gauge station PBN (15)	391,504	6,262,449
Yeso River	Control Station El Yeso Intake	399,666	6,272,077
Colorado River	Stream gauge station El Sauce	380,449	6,287,261
Colorado River	Intake control station Colorado River	389,063	6,292,501

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 31
Cultural, Paleontological, and Natural
Heritage:
1.- Baseline

In point V.6 in the EIS, regarding cultural heritage, the existence of heritage resources within the Project's area of influence is recognized, stating that "three areas are identified as featuring resources of cultural interest: Las Morrenas and Camino del Inca in the Lo Encañado Lake area, and the site known as Aucayes I in the Colorado River - Aucayes Stream area (...). In the Alto Volcán area, sites have been detected that may contain very ancient fossils or paleontological material (...) PHAM works shall not generate any direct intervention".

Further on in the document, in Table 7 (Identification, prediction, and evaluation of environmental impacts and risk situations) it is recognized that the Project shall have a LOW-SIGNIFICANCE NEGATIVE IMPACT on these resources. It should be pointed out that the impact on heritage resources is NEGATIVE AND IRREVERSIBLE (implying their destruction) and therefore cannot be considered to be of low significance.

Furthermore, in TABLE 6, it is stated the Project SHALL NOT AFFECT CULTURAL HERITAGE SITES IDENTIFIED IN THE BASELINE.

Please clarify the contradictions between information provided by the Project Owner in the baseline and in tables 6 and 7: Will the Project have an impact on the area's archeological and paleontological resources, or will it not?.

Please indicate why no information was provided on the Inca site at Laguna del Indio. This site is located just a few meters from the Inca trail located 1.5 km from the Project, and consists of a collection of structures in a natural depression, immediately to the W of the Laguna del Indio (Yeso River). The site contains four main enclosures, separated by a central passageway, with each enclosure subdivided into smaller rooms. Several of these rooms show clear evidence of looting. (UTM 396,500 E 6,274,479 N) Elevation 2692 m. The site features a number of architectural features typical of Inca architecture (Late period, c. 1470 to 1535 CE). The site features typical construction techniques, with double walls filled in with small stones. The central passage features a precise E-W orientation, and the layout divides the site perfectly into four parts. The site is associated with the Inca Trail known as the Camino del Inca (see the publication *Nuevos Registros de Asentamiento Inca en la cordillera andina de Chile Central*. Luís E. Cornejo B., Miguel A. Saavedra v. & Héctor Vera C. 2006.).

Please clarify why no reference is made to the existence of published sites located near to the Project.

Thematic responses

ARQ Archeological and
Paleontological Sites:
Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

AGU.01
Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum**.

1.
ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest

(e.g. concentrations of

Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material
- b) creation of a viewpoint
- c) fossil trail

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

ARQ.03 Scientific research

The scientific and cultural importance of the paleontological resources present has been recognized by the PHAM project principal, leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the project principal has taken on a commitment to enhance knowledge of the area before starting planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may be detected during the course of construction under the PHAM. These activities will contribute not only to the maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of materials or components present.

For more information, see **Annex 14 of Addendum 1**.

Remark N° 32
Cultural, Paleontological, and Natural
Heritage:
2.- Environmental Monitoring Plan

Chapter 8 contains the Environmental Monitoring Plan, which will allow the monitoring of relevant environmental variables that have given rise to the content of the EIS. Here, the Project Owner states that *"The PHAM hereby submits to the SEIA that during execution of the Project certain effects, characteristics, or circumstances referred to in subsections b), d), e), and f) of Article 11 of Law 19,300 may arise or be caused, and that therefore the implementation of the Project shall include a suite of mitigation, compensation, or restoration measures that are suitable for offsetting these effects"*. Part f) of that Article refers to *"alteration of monuments, sites with anthropological, archeological, or historic value, and, in general, sites belonging to cultural heritage"*, including areas of paleontological interest.

Although heritage is specifically recognized as a relevant environmental variable, it is recognized that it will be affected by a negative impact, and the presence of a suitable professional is proposed, in order to undertake continual monitoring during the construction phase; nonetheless, the EIS does not contain plans to integrate this action into the environmental monitoring plan.

Clarify these contradictions.

Thematic responses

ARQ Archeological and
Paleontological Sites:
Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

AGU.01
Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum 1**.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material
- b) creation of a viewpoint
- c) fossil trail

For more information and details on the preservation of heritage value and

paleontological resources, please see **Annex 14 of Addendum 1**.

ARQ.03 Scientific research

The scientific and cultural importance of the paleontological resources present has been recognized by the PHAM project principal, leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the project principal has taken on a commitment to enhance knowledge of the area before starting planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may be detected during the course of construction under the PHAM. These activities will contribute not only to the maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of materials or components present.

For more information, see **Annex 14 of Addendum 1**.

Remark N° 33
Cultural, Paleontological, and Natural
Heritage:
3. Preventive measures

In order to protect heritage resources, the Project Owner plans to obtain "continual on-site expert advisory services to prevent or minimize impact" (table 7). At which work sites will archeological monitoring be implemented? This question should also be taken to include muck disposal sites, sites for the extraction of aggregates and sand, and works involving improving, widening, and maintaining roads.

Furthermore, we do not consider this measure to constitute a "risk and accident prevention measure", but that it should rather be included in the environmental monitoring plan, for the reasons expressed in the previous point.

Thematic responses

ARQ Archeological and
Paleontological Sites:
Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

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For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

AGU.01
Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

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- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
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1.

ARQ.02 Values preservation

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ii) Delimitation of buffer zones

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The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

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In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

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- b) creation of a viewpoint
- c) fossil trail

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

ARQ.03 Scientific research

The scientific and cultural importance of the paleontological resources present has been recognized by the PHAM project principal, leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the project

principal has taken on a commitment to enhance knowledge of the area before starting

planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may be detected during the course of construction under the PHAM. These activities will contribute not only to the maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of materials or components present.

For more information, see **Annex 14** of **Addendum 1**.

Remark N° 34
Cultural, Paleontological, and Natural
Heritage:
4. Sites of Paleontological Interest

The Project Owner plans to conduct a complementary paleontological study in advance of construction, and to implement certain management measures to protect the resources currently registered with the SPACH, and other resources that may be discovered. In this regard, during the evaluation of the first EIS presented, which is currently under review, the CMN, which is the competent body in the field, has already issued a request for the preparation of a report that has yet to be produced.

When does the Project Owner plan to comply with this requirement? Specifically, what are the "management measures" that the Project Owner plans to implement to protect these resources?.

Thematic responses

ARQ Archeological and
Paleontological Sites:
Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

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For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

AGU.01 Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

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- Workforce training on the possible presence of archeological sites.
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ARQ.02 Values preservation

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iv) Compensation measures

- a) production of cultural information material
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- c) fossil trail

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

ARQ.03 Scientific research

The scientific and cultural importance of the paleontological resources present has been recognized by the PHAM project principal, leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the project

principal has taken on a commitment to enhance knowledge of the area before starting

planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may be detected during the course of construction under the PHAM. These activities will contribute not only to the maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of materials or components present.

For more information, see **Annex 14** of **Addendum 1**.

Remark N° 35
Cultural, Paleontological, and Natural
Heritage:
5. Annex 43

This annex contains the minutes of a meeting held on January 3, 2008, and it is therefore not appropriate to cite it in the Project assessment currently under review. Furthermore, it is there stated that the issue of paleontological heritage is outside of the remit of the PAC and ICSARA (we assume that this refers to the EIS that was withdrawn), and yet the Project Owner states that "AES Gener thanks the SPACH for highlighting the scientific and cultural value of these bodies of evidence, which it recognizes and respects, and although they do not fall within the established procedure it shall include them as part of the citizen participation process". As stated in point 4 of this document, the CMN (the applicable competent body) has yet to issue a statement on the significance of these paleontological resources, and requested the preparation of a report complying with the items specified in the corresponding ordinance. The Project Owner has yet to respond to this requirement. Additionally, the minutes contained in Annex 43 also set forth a series of items agreed with the SPACH, including: "Based on these concepts, within the next two days the SPACH shall prepare a methodological proposal to form an agreement with AES Gener regarding the scope, by means of a joint agreement that includes the commitments made in the agenda." If this proposal must be submitted by January 5, why was it not included in the study currently under review? The following item states that: "All necessary permits shall be submitted for procedures conducted by the SPACH, and this body shall be directly involved in the procedures to be implemented." In this regard, the Project Owner is requested to indicate the name of the qualified paleontologist who shall be responsible for obtaining these permits.

The Project Owner is hereby informed that the permits granted by the CMN for intervention in this type of resource are personal in nature, and therefore cannot be requested by the SPACH. Requests made to the CMN must specify a number of points, including the professional responsible for the activity, work team, specialists who are to analyze materials, and methodology for excavation or recovery of finds, and analysis (see the regulations on Law 17,288, on persons authorized to conduct surveys and request permits to excavate and intervene affecting such resources). Finally, the Project Owner is hereby informed that excavation permits constitute a sector environmental permit, and as this permit is necessary, it should already be requested under the study presented in the plan for compliance with environmental legislation in force (Point 2 of the executive summary)

Thematic responses

ARQ Archeological and
Paleontological Sites:
Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

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- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

AGU.01
Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum**.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental

damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access

restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) **production of cultural information material**
- b) **creation of a viewpoint**
- c) **fossil trail**

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

Remark N° 36
Cultural, Paleontological, and Natural
Heritage:
6. The El Morado
Monument

CONAF, in Ordinance 30 dated February 5, 2008, and Ordinance 70 dated April 9, 2008, requested that the line taken by the tunnel be adjusted so as not to enter this protected area, as it considered that the Project Owner had been unable to guarantee that the construction and operation of the El Volcán Tunnel would not lead to impacts on the resources and processes that the area protects - in particular, geological and geomorphological processes and features, including the glacier and fossil-bearing strata; rather, the Project Owner was only able to express that the occurrence of problems or contingencies was of low likelihood.

The objective of the creation of this monument was "To preserve an ecosystem that is representative of the Upper Maipo Basin (Morales Stream) through the protection of its natural scenic beauty, its geological and geomorphological processes, and its endangered life-forms". The area's specific conservation objectives include "preservation of the geological and geomorphological processes and features present in the Area, including the glacier and fossil-bearing strata; protection of the Area's natural scenic beauty, including its glacier, vegetation, lake, streams, mineral waters, and fossil-bearing rock strata, and support of scientific research into its natural and cultural resources, permitting the enhancement of knowledge regarding the area".

Clarify these contradictions, and explain why the modification requested have not been implemented.

Thematic responses

ARQ Archeological and
Paleontological Sites:
Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

AGU.01
Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum 1**.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compe neasures

- a) a)production of cultural information material
- b) creation of a viewpoint
- c) fossil trail

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1.**

ARQ.03 Scientific research

The scientific and cultural importance of the paleontological resources present has been recognized by the PHAM project principal, leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the project principal has taken on a commitment to enhance knowledge of the area before starting planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may be detected during the course of construction under the PHAM. These activities will contribute not only to the maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of materials or components present.

For more information, see **Annex 14 of Addendum 1.**

Remark N° 37
Cultural, Paleontological, and Natural
Heritage:
7. Protected areas: La Engorda
Meadow

The EIS contains plans to alter these meadows/wetlands through installing pipelines running underneath them, construction of inlets, and construction of certain access routes and the El Morado siphon. In this regard, it can be stated that - as is suggested by its name - this meadow and the vegetation that surrounds it represent a unique ecosystem, which is of particular importance due to its use fattening up livestock. Nonetheless, the Project does not feature suitable mitigation and compensation measures.

The Project Owner should include the mitigation and compensation measures that it therefore plans to implement.

Thematic responses

F&F Biodiversity Impact

Flora and
Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles,

70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of
species affected

Aquatic flora and
fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and
vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neoporteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial
fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Lilolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and
fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic

communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

F&F.02.02 Mitigation

Aquatic flora and fauna

The Project calls for a suite of multi-purpose environmental management measures that aim to minimize its effects on living organisms, including: minimization of watercourse areas to be subject to intervention by prioritizing such works for late summer and early fall seasons (period of lowest flow rates), the adoption of special precautions to prevent accidental spillages into watercourses (prohibition of the storage of lubricant drums in or near watercourses, etc), and permanent maintenance of ecological flow rates.

For more detailed information, including technical documentation that complements the information described above, see Annex 17 of the Addendum.

Terrestrial Flora and Vegetation

In order to prevent and/or minimize the Project's effects on plant life, it plans to adopt a number of integrative measures: micro-routing in advance of starting work on-site, in order to identify specimens of plants listed in any conservation category and subject to impact; compensation with the planting of 10 specimens for every one destroyed, in the case of non-woodland species listed for conservation; implementation of a woodland management plan applicable to woodland areas, which describes its measures in accordance with Article 5 of the Woodland Law; implementation of vegetation restoration plans at muck disposal sites, encampments, artificial slopes, and tunnel access terraces (EIS, Annexes 7 and 29). More in-depth information on complementary measures is provided in Annex 6 of Addendum 1.

Terrestrial fauna

Specific wildlife environmental management measures have been proposed for each particular species, taking into account prior experience in the success of these measures in similar projects. These measures will be implemented in continual coordination with the Servicio Agrícola y Ganadero. Principal measures include: capture of individuals belonging to species of conservation interest for rescue and relocation; controlled perturbation actions; and habitat replacement. Other measures are based on the use of signage, training for Contractors, and contractual requirements for on-site supervision (see details in Section 6.4.1.6 of the EIS).

See Annex 4 of the Addendum for the native wildlife rescue and relocation plan.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as

making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

SUE.01 Regulations

The Project Owner is subject to the following regulations, which are specified in detail in Chapter 5 of the EIS, Section 5.7.2.1, regarding the Santiago Metropolitan Master Plan.

With regard to planning instruments, the PHAM is to be implemented in the district of San José de Maipo, which does not have a District Master Plan (one is currently being prepared), and which only has current urban limits for the settlements of San Alfonso, La Obra, San José de Maipo, El Melocotón, San Gabriel, and Las Vertientes. Conversely, the Santiago Metropolitan Master Plan (PRMS) establishes a number of land use regulations that apply to the project area, most of which are related to ecological preservation and/or protection and risks. Most of the district's surface area is classed as Ecological Preservation Area, which aims to maintain a zone's natural state, in order to preserve and contribute to the environment's quality and equilibrium, as well as to preserve landscape heritage (see further information in the conclusions stemming from analysis of regulations, in Section 5.7.3, Chapter 5 of the EIS).

Supreme Decree 366 (Exploitation of Tamarugo, Carob, Chañar, Guayacán, Aextoxicon, Charcoal, Acacia, Boldo, Maiten, Litre, Bollen, and Quillay). This legal instrument governs the felling of trees and bushes.

Supreme Decree 4363 and D.L 701 (Approving the Definitive Text of the Law on Woodland and Regulations on Forest Promotion).

Article 2 of the Woodland Law establishes an obligation that land classified as for preferential woodland land use, as well as natural and artificial woodlands, are subject to woodland management plans approved by the National Forestry Commission (CONAF). Furthermore, Article 21 of Decree Law 701 establishes that any felling or usage of native woodland shall be subject to the CONAF's prior approval of the corresponding management plan.

Decree 82 (Prohibiting the Felling of Trees and Bushes in Indicated Andean High Mountain and Foothill Areas)

Article 102 Sector Environmental Permit (Permit for the felling or exploitation of native woodland, in any type of land, or plantations located in land with preferential characteristics for woodland use).

For further information and analysis on the aforementioned regulations and permits, as applicable to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see Sections 3.2.6 and 3.3.7 in Chapter 3 of the EIS.

SUE.02 Soils, meadows, and wetlands

The Project Owner has conducted a number of studies with the aim of characterizing the vegetation of summer grazing areas (La Engorda) (see details in Addendum 1, Annex 6, and in Chapter 5 of the EIS), as well as flora and vegetation studies in the Project's area of influence (EIS, Chapter 5).

These studies contain information compiled in fieldwork campaigns conducted in Fall 2005, Spring 2006, November 2007, March 15 and 16, 2008, and September 2008, which add to the body of knowledge available regarding vegetation in these areas.

The Lo Encañado area shall be assigned a status of controlled access area for works contractors at all times: it shall not be subject to any intervention whatsoever. For more information on vegetation areas that could be affected by the construction works, and to learn about mitigation measures proposed by the Project Owner, you are advised to review Annex 42 of the EIS and Annex 6 of the Addendum.

With regard to environmental regulations that apply specifically to vegetation and plant life, the Project Owner shall be subject to:

Supreme Decree 366 (Exploitation of Tamarugo, Carob, Chañar, Guayacán, Aextoxicon, Charcoal, Acacia, Boldo, Maiten, Litre, Bollen, and Quillay). This legal instrument governs the felling of trees and bushes.

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Remark N° 38

Effects of the presence of Run-of-the-River Hydroelectric Plants in the Maipo River Basin Regarding Renewal of Aggregates Resources

In accordance with Supreme Decree 95/01, Reglamento S.E.I.A.

Article 6: The Project generates significant adverse effects on the quality and quantity of renewable natural resources, including soil, water, and air.

THE PHAM'S EIS DOES NOT CONSIDER THE CORRECT MAGNITUDE OF IMPACTS ON NATURAL AGGREGATES RESOURCES in the Volcán, Colorado, Yeso, and Maipo Rivers.

According to the book *Industria del Árido en Chile – Sistematización de Antecedentes Técnicos Ambientales*, Volume I, Santiago, published in December 2001 by the Comisión Nacional de Áridos y Corporación de Desarrollo Tecnológico, with the support of the Ministry of Public Works, Ministry of Housing, and Chilean Chamber of Construction, aggregates resources are considered renewable if they are extracted from watercourses.

The run-of-the-river power plants that operate in the Upper Maipo Basin (Volcán Queltehues, Alfalfal, and Los Maitenes) have altered the natural dynamics of solids transport in the watercourses, particularly in the case of sands. This is due to the following facts:

- 1) Sand is trapped in sand traps, as it is damaging to headworks and turbines. If the water is returned to the watercourses, this does not occur in a timely manner; and the sections of watercourses between abstraction works and points of water return suffer a drop in solid transport capacity, as a result of the reduction in water flow rate;
- 2) Gravel trap flushing at intakes does not guarantee that sediments continue on downstream, as such events occur at low frequency - which factor, combined with the decline in flow rates, favors the consolidation of materials in the stretches between water abstraction and return;
- 3) The clean water returned into the watercourses causes erosion, does not contribute sediments, and generates an imbalance in aggregates resources (input without sediment and output with sediment implies erosion);
- 4) Persons engaged in artisanal sand production in San José de Maipo state that when the Alfalfal and Los Maitenes, located in the Colorado River sub-basin became operative, sand production in this sub-basin suffered a permanent decline of approximately 30%.

It should also be mentioned that, apart from the four sub-basins that form the Upper Maipo Basin (bounded by the Maipo River rain gauge station at El Manzano), at present only the El Volcán sub-basin is free of any intervention that could have a negative impact on sediment transport in the Upper Maipo River Basin.

It is considered necessary that the Project Owner should characterize the sediment transport dynamics of the Upper Maipo River Basin, as well as sources of production, and should evaluate levels of impact on sand transport, principally, associated with existing and planned power plants. This information should be included in the Environmental Impact Study baseline.

Furthermore, in order to evaluate the Project's impact on the sediment load from the Volcán River sub-basin, the Project Owner is required to include a complete hydrological study for this sub-basin, defined as the section of the Volcán River located immediately upstream of the point where it empties into the Maipo River.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap

particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses.

through periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (**AGU.06.01**), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted.

It can be concluded that the Maipo River system can be managed such that, With the Project operational, present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them.

Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

AGU.06.03 Maipo River Sand Production

With regard to the extraction of aggregates in the Maipo River, during the operations phase of the PHAM, the Project will not modify current natural sediment (aggregates) transport dynamics occurring in the river.

In effect, under the natural dynamics, sediment transport takes place mainly in the months of November, December, and January, as a result of snow and ice melt in the high mountains, and it is during this season that variations in

flow rate in the Maipo River caused by the project stand at their lowest levels. The same behavior applies to winter season rises in river level.

It must be pointed out that the PHAM returns water to the Maipo River in the Las Lajas area, located upstream of the El Canelo zone, and therefore downstream of this point the river's flow dynamics with the project shall be identical to those currently observed.

It is of great importance to observe that currently, without the PHAM in operation, slightly downstream of the Las Vertientes area (in the La Obra stretch of the river), during certain times of the year flow rate in the Maipo River watercourse drops significantly, leaving the river bed dry, due to water abstraction at the following intakes: La Sirena Channel, San Carlos Channel, Independent Intake owned by Aguas Andinas, etc.

Average water abstraction flow rates attributable to the main drinking water and irrigation intakes, many of which also make use of hydroelectric power as a byproduct, but discounting the effects of existing hydroelectric plants on these channels that discharge directly into the intakes, amounts to 113 m³/second, which is equal to the average annual flow rate in the Maipo River at Las Vertientes. Depending on water availability, the annual abstraction rate at these intakes varies between 78 and 164 m³/second.

This situation clearly explains the high level of perturbation observed in the behavior of the Maipo River watercourse downstream of Las Vertientes, where the riverbed is dry except during periods of increased water level and in unusually wet years.

It is for this reason that the Project Owner asserts that its activities will have no impact on the current situation in the sand extraction sites located on the Maipo River.

AGU.06.04 Discharge effects

Water capture in advance of in-situ gravel removal leads first to a reduction in sediment load in water carried through the headworks to the turbine rooms, while the solid materials that is retained is returned to the river. At the point where water is discharged from the plants (Las Lajas area), water that has passed through the turbines - which contains a certain quantity of sediment - once again mixes with the water in the rivers, returning to its original conditions in terms of

average sediment load (**Addendum, Section I, Question 28**).

At the point where water is returned to the Maipo River, in the Las Lajas area, there will be no degradation of the riverbed as it is composed entirely of rocks. It should be mentioned that the flow rate discharged from the PHAM at this

point is always lower than the flow rate in the Maipo River just upstream. During the operations phase of the Project, planned maintenance activities do not include any cleaning of tunnels and culverts. Inside the tunnels, the cross sectional area for water flow is small enough to prevent sedimentation. This is shown through the operation of the Alfalfal Plant for 20 years without any cleaning of the tunnels being included among maintenance activities.

The only operations that lead to the discharge of sediment are the discharge of gravel traps at the inlets, and the flushing of the sand traps, returning sediment to the river once a certain volume has built up within them. These operations are conducted intermittently and for short time periods (1 minute for sand traps, 10 minutes for gravel traps), at variable frequency depending on the season. For more information see the **Addendum, Section IV, Question 3.**

Remark N° 39

Erosion Impacts on the Maipo River Due to the Discharge of Clean Water and Hydrological Changes Due to Synergies Between Impacts

The Maipo River watercourse will suffer erosion downstream of the plants' spillways due to the effects of clean water, which carries no solids in suspension.

The water used in hydroelectric power generation are returned to the main course of the Maipo River between the El Canelo and El Manzano areas. In view of the operating capacity of these run-of-the-river power plants, which implies a potential discharge of 65 m³/s, is it cause for concern that no analysis has been conducted into the erosion effects of these altered flow dynamics downstream, which alter the natural drainage regime of the Upper Maipo River.

The Project Owner must evaluate the erosive effects of water returned to the system from the PHAM. The effect should be analyzed mainly for the months from October through March, during the ice melt season.

These negative effects are interlinked, as the lack of entry of solid materials downstream of the point of discharge results in imbalances that lead to changes in the Maipo River's hydrogeological system.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum.**

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study** presented in **Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfal Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total

solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential expected solid streambed wear/entrainment (transport capacity) in the rivers, calculated based on the theoretical modeling of their hydraulic characteristics

and theoretical numerical relationships.

2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (AGU.06.01), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted.

It can be concluded that the Maipo River system can be managed such that, With the Project operational, present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them.

Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

Remark N° 40

Impacts on Aggregates Extraction Activities in the Districts of San José de Maipo, Puente Alto, Pirque, San Bernardo, and Buin

The PHAM's planned water intakes in the Volcán River sub-basin will lead to the following effects:

- 1) Given that the Project will inhibit practically all of the water flow provided by ice-melt attributable to the Volcán River sub-basin during the October - March ice melt season, only water from the Maipo River sub-basin will be available to transport sediment in a stretch approximately 60 km in length, running from the junction with the Volcán River and the Maipo River to the junction with the Colorado River and the Maipo River. It should be noted that the Yeso River is totally modified by the Laguna Negra and Lo Encañado reservoirs, such that its contribution to ice melt water flow is insignificant or nonexistent;
- 2) Considering that it is a fact that most renewal of small particle size material occurs during the ice melt season, it can be stated that in terms of the renewal of aggregates resources, the PHAM shall impact 75% of such resources in the Upper Maipo River Basin - an utterly foreseeable impact with undefined repercussions in view of the nature of the Project, and therefore impossible to rule out;
- 3) Water discharged from the PHAM shall exacerbate the sediment deficit downstream of the point of discharge;
- 4) In the districts of San José de Maipo, Puente Alto, Pirque, San Bernardo, and Buin, intensive aggregates extraction activities are undertaken. This activity already presents limitation that are the subject of studies to determine whether there is a need to partially restrict extractive activities, and whether an environmentally sustainable project running across these districts can be instituted, taking in the stretch of river from the outflow of the Clarillo River through to the Puntilla de Lonquén Railway Bridge.

Additionally the DOH, by way of Official Communication DOH RM N° 462 dated 24 May, 2006, has imposed a zone where extractive activities are restricted running four kilometers upstream and downstream of the Maipo Bridge (Pan-American Highway), only approving projects based on the natural renewal of the resource. As the Maipo River falls within the jurisdiction of these districts, and in view of the ex-ante presence of the PHAM, and the vulnerable nature of this activity, the importance of aggregates as a raw material for construction, and economic and social repercussions particularly affecting irrigation, it can be shown that the PHAM's area of direct influence should extend through to the Maipo River at the Puntilla de Lonquén Railway Bridge. Studies required: In response to the questions raised above, the PHAM is requested to conduct the following studies in order to verify effects on the Maipo River in the medium and long term:

- * Study on the loss of aggregates through retention in intakes
- * Study on the loss of aggregates through reduced solid transport capacity in river water
- * Study on erosion in the river system through the effects of discharging clean water
- * Study on changes in the hydro-geological system of the Maipo River Valley

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should

be expected to contain 85% of the sediment in

suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (AGU.06.01), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted.

It can be concluded that the Maipo River system can be managed such that, With the Project operational, present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them.

Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

AGU.06.03 Maipo River Sand Production

With regard to the extraction of aggregates in the Maipo River, during the operations phase of the PHAM, the Project will not modify current natural sediment (aggregates) transport dynamics occurring in the river.

In effect, under the natural dynamics, sediment transport takes place mainly in the months of November, December, and January, as a result of snow and ice melt in the high mountains, and it is during this season that variations in

flow rate in the Maipo River caused by the project stand at their lowest levels. The same behavior applies to winter season rises in river level.

It must be pointed out that the PHAM returns water to the Maipo River in the Las Lajas area, located upstream of the El Canelo zone, and therefore downstream of this point the river's flow dynamics with the project shall be identical to those currently observed.

It is of great importance to observe that currently, without the PHAM in operation, slightly downstream of the Las Vertientes area (in the La Obra stretch of the river), during certain times of the year flow rate in the Maipo River watercourse drops significantly, leaving the river bed dry, due to water abstraction at the following intakes: La Sirena Channel, San Carlos Channel, Independent Intake owned by Aguas Andinas, etc.

Average water abstraction flow rates attributable to the main drinking water and irrigation intakes, many of which also make use of hydroelectric power as a byproduct, but discounting the effects of existing hydroelectric plants on these channels that discharge directly into the intakes, amounts to 113 m³/second, which is equal to the average annual flow rate in the Maipo River at Las Vertientes. Depending on water availability, the annual abstraction rate at these intakes varies between 78 and 164 m³/second.

This situation clearly explains the high level of perturbation observed in the behavior of the Maipo River watercourse downstream of Las Vertientes, where the riverbed is dry except during periods of increased water level and in unusually wet years.

It is for this reason that the Project Owner asserts that its activities will have no impact on the current situation in the sand extraction sites located on the Maipo River.

AGU.06.04 Discharge effects

Water capture in advance of in-situ gravel removal leads first to a reduction in sediment load in water carried through the headworks to the turbine rooms, while the solid materials that is retained is returned to the river. At the point where water is discharged from the plants (Las Lajas area), water that has passed through the turbines - which contains a certain quantity of sediment - once again mixes with the water in the rivers, returning to its original conditions in terms of

average sediment load (**Addendum, Section I, Question 28**).
At the point where water is returned to the Maipo River, in the Las
Lajas area, there will be no degradation of the riverbed as it is composed entirely

of rocks. It should be mentioned that the flow rate discharged from the PHAM at this point is always lower than the flow rate in the Maipo River just upstream.

During the operations phase of the Project, planned maintenance activities do not include any cleaning of tunnels and culverts. Inside the tunnels, the cross sectional area for water flow is small enough to prevent sedimentation. This is shown through the operation of the Alfalfal Plant for 20 years without any cleaning of the tunnels being included among maintenance activities.

The only operations that lead to the discharge of sediment are the discharge of gravel traps at the inlets, and the flushing of the sand traps, returning sediment to the river once a certain volume has built up within them. These operations are conducted intermittently and for short time periods (1 minute for sand traps, 10 minutes for gravel traps), at variable frequency depending on the season. For more information see the **Addendum, Section IV, Question 3.**

Remark N° 41

Impacts on the Socio-Economic Structure Regarding Activities Conducted by Artisanal Sectors and Industries Engaged in the Extraction of Aggregates Throughout All Tributaries of the Maipo River

In accordance with Supreme Decree 95/01, S.E.I.A. Regulations:

Article 8: The Project causes the resettling of human communities or significant changes in the ways of life or customs of human groups.

THE PHAM'S EIS DOES NOT CONSIDER IMPACTS ON SOCIO-ECONOMIC ASPECTS regarding activities conducted by artisanal sectors and industries engaged in the extraction of aggregates throughout all tributaries of the Maipo River.

- * The limits established for the PHAM's area of influence are insufficient in terms of establishing socio-economic impacts, given that in these terms the Project's environmental impact affects extractive activities in all tributaries of the river system, that is, from San José de Maipo to Lonquén.
- * The absence of a study to evaluate the existence of this activity, as well as the impacts that shall be caused by the PHAM. The environmental impact study ignores the presence of this industry sector, which is of importance for the development of the region.

GROUNDING FOR THE TWO REMARKS

A little history: Since around the year 1900, the banks of the Maipo River have been the site of major production activity in the field of aggregates extraction. During the early years, this was an almost purely small-scale activity, undertaken by the families who lived along the riverbanks, who suffered greater harm with every year that passed through the flooding of what was a very different watercourse to the form that it currently takes.

As the decades passed, this activity became an industry not only for the families who lived along the river's banks; as the industry grew, and as demand for aggregates in the region rose, the sector saw major development leading to the start of a significant industrial activity, advancing side by side with artisanal sectors. This was such a major industry that areas like the Cajón del Maipo owed their development to this extractive industry.

Starting in the 1990s, and with the return of democracy, the small-scale producers who were the descendents of the first families to settle on the riverbank formed syndicates that still exist today. This was also the time when the boundaries of extraction areas were set. On request by the "Federación 22 de Enero", which is an association of sand production syndicates in the Maipo River, and by way of the Zoning Act of 1990, it was agreed that a systems of zones would be established limiting extraction activities, applying to both sand production syndicates and companies active in the industry.

An integral part of this agreement constituted an artisanal aggregates extraction program in this stretch of the river, as well as 5 annexes containing basic information on the extraction program for each of the syndicates that made up the "Federación 22 de Enero", base cartographic material specifying the zoning system, and technical guidelines for aggregates extraction (artisanal and mechanized). Under the river's 1990 zoning system, areas are set aside exclusively for artisanal activities, and, in view of the rapid development of mechanized activities, other areas were specified for associated artisanal/mechanized extraction (with industrial groups).

On the Syndicates

Along the stretch of the river running from the Los Morros Bridge to the Maipo Bridge, 7 syndicates have been identified, in addition to the syndicates located in Pirque, Puente Alto, and Lonquén, all of which specifically identify their key activity as aggregates extraction and which possess significant organizational capacity. All in all, there are approximately 1500 persons employed exclusively in aggregates extraction, as well as a significant number of truck owners, drivers, and resource location personnel. It is therefore estimated that around 4,500 persons in the region make their living from this activity (consisting of the family groups to which each industry worker belongs).

Additionally, these syndicates form an important resource in terms of social support for their members, as they take on the role of providing social resources and materials when any of their members falls ill, or becomes unable to continue to engage in their work as a result of invalidity or old age. Thus, for example, a proportion of the financial resources earned through aggregates production is set aside to ensure the survival of persons who are unable to continue to take part in the industry for these reasons, and their families. This provision is also guaranteed for the widows of syndicate members.

On the Companies

In addition to the syndicates, approximately 14 companies are engaged in aggregates extraction along the Maipo River, not including the major cement production companies that gather this resource from the river - which shall also be affected by the Project, and which are similarly not considered in the EIS.

From a cultural point of view, it is important to underscore that the trade of sand production is one that is passed down from generation to generation. Children of producers start to take part in the activity at a very early age, when their parents or grandparents pass on their knowledge to the next generation. In this regard, even a temporary interruption in studies represents a significant problem for this group of people. In view of the relevance of this consideration explained above, the question thus arises of the possibility of a change in trade activity in the event that a lack of aggregates renders this sector non-productive - given that, as some syndicate members put it, "a sand man is born and dies in the river", and the knowledge and skills of syndicate members are strongly or exclusively linked to aggregates extraction. Furthermore, and as indicated above, a large number of persons are not directly engaged in aggregates extraction, but do depend on this industry for their livelihood. In this regard, any impact on the activity also implies the creation of new social problems specifically associated with unemployment, together with the disappearance of an item of cultural heritage that has been a driving force behind development in the region.

Regarding the questions: Based on the above, and from a socio-economic perspective, two questions are presented to the PHAM:

- * How will the Project ensure the permanence and development of extractive industry in the Maipo River?
- * How will the Project guarantee to municipal/district governments that it will ensure the permanence of resources derived from extraction, if the extractive industry is affected?

Studies required: In response to the questions raised above, the PHAM is requested to conduct a study of the socio-economic impacts that will be caused by the operation of the

Proyecto Hidroeléctrico Alto Maipo, affecting artisanal and mechanized sand extraction industries that depend on the Maipo River, in the medium and long term.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.06 Sediments

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum**.

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As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.03 Maipo River Sand Production

With regard to the extraction of aggregates in the Maipo River, during the operations phase of the PHAM, the Project will not modify current natural sediment (aggregates) transport dynamics occurring in the river.

In effect, under the natural dynamics, sediment transport takes place mainly in the months of November, December, and January, as a result of snow and ice melt in the high mountains, and it is during this season that variations in flow rate in the Maipo River caused by the project stand at their lowest levels. The same behavior applies to winter season rises in river level.

It must be pointed out that the PHAM returns water to the Maipo River in the Las Lajas area, located upstream of the El Canelo zone, and therefore downstream of this point the river's flow dynamics with the project shall be identical to those currently observed.

It is of great importance to observe that currently, without the PHAM in operation, slightly downstream of the Las Vertientes area (in the La Obra stretch of the river), during certain times of the year flow rate in the Maipo River watercourse drops significantly, leaving the river bed dry, due to water abstraction at the following intakes: La Sirena Channel, San Carlos Channel, Independent Intake owned by Aguas Andinas, etc.

Average water abstraction flow rates attributable to the main drinking water and irrigation intakes, many of which also make use of hydroelectric power as a byproduct, but discounting the effects of existing hydroelectric plants on these channels that discharge directly into the intakes, amounts to 113 m³/second, which is equal to the average annual flow rate in the Maipo River at Las Vertientes. Depending on water availability, the annual abstraction rate at these intakes varies between 78 and 164 m³/second.

This situation clearly explains the high level of perturbation observed in the behavior of the Maipo River watercourse downstream of Las Vertientes, where the riverbed is dry except during periods of increased water level and in unusually wet years.

It is for this reason that the Project Owner asserts that its activities will have no impact on the current situation in the Sand extraction sites located on the Maipo River.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. The study also investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 42

Other Remarks

What is the contribution of the Volcán River sub-basin to total flow rates during the ice-melt season (October-March)?

What are the total contributions from ice-melt?

What is the effect on base flow rates in the rain precipitation and snow precipitation seasons?

What is the level of sediment input from the Volcán River sub-basin?

Why is it not deemed that all sediments from this sub-basin will be withdrawn, in view of its snow-driven flow dynamics?

How much sediment will be retained in high mountain intakes?

How much sand will be produced by the sand traps? Where will this material be disposed of?

Given that flow rates in the Volcán River sub-basin currently contribute not only to the snow melt flow of the Maipo River but also to the river's base flow rate, and given that the transport capacity will be modified in different sections of the river, how will the Project Owner manage this effect?

Sediment availability will decline not only through the inhibition of input from the Volcán River sub-basin, as well as through the erosive effect of the clean water discharged, but also because the transport capacity will be artificially increased in terms of magnitude and frequency. How will the Project Owner manage this effect?

In the EIS, the Project Owner indicates that it will construct a series of installations that shall have to be subcontracted, transferring the requirement for approval for the transport of aggregates from their point of extraction to the construction site; however, these works will be part of the Project. Clarification is required in this regard.

In the EIS, it is determined that the area of direct influence constitutes the district of San José de Maipo, as modifications to the hydro-geological dynamics of the river shall affect socio-economic issues that depend on aggregates resources (municipal government-run, industrial, and artisanal) beyond the limits of the area of direct influence. How does the Project Owner plan to remedy the deficiencies in the definition of the area of influence?

According to the latest reports on production activity, the Maipo River Basin has an annual renewal capacity of approximately 4 million cubic meters of aggregates, which are extracted from the stretch passing through the districts of an José de Maipo, Pirque, Puente Alto, San Bernardo, Buin, and Isla de Maipo. How does

the Project Owner plan to remedy potential reductions in this resource? Other Remarks:

- * The information provided contains discrepancies (example: flow rate information).
- * Information on the hydrological analysis commissioned by the Project Owner is missing.
- * Information permitting the suitable analysis of impacts of activities and construction conducted between the mouth of the Colorado River and the water discharge point at Las Lajas, and their dependence on hydraulic conditions in the river.
- * Impact through the changes that will be caused in the sedimentation dynamics of the river system is neither provided nor evaluated.

In light of the Project's predicted effects modifying flow patterns, the following effects are expected to arise in the sedimentation equilibrium of the watercourses subject to intervention (Yeso, Colorado, and Maipo Rivers):

- * Reduction in flow rate in the Volcán, Yeso, and Colorado rivers downstream of the intakes of the Alfalfal II hydroelectric plant will result in a decline in sediment transport capacity. This means that there will be a reduction in the average predicted contribution of sediments flowing from the aforementioned watercourses into the Maipo River, which, particularly downstream of the Colorado River, equates to 15% of predicted transport in the Las Vertientes area, and 25% of potential transport in the San Bernardo area (as the study indicates)
- * A sharp rise in transport capacity in the Maipo River at the point of discharge of the hydroelectric plant (confluence of the Maipo River with the El Manzano Stream), resulting from the discharge of clean water from the power plants.
- * The analysis presented does not consider the creation of local imbalances in the tributaries of the Maipo River.

This will lead to the degradation of the riverbed of the Maipo River. None of these potential effects are addressed in the sedimentation study, and in the transport capacity through the incorporation of clean water. Similarly, the effects of imbalances introduced in the input of aggregates or the extent of the watercourse affected, are also not addressed.

Finally, regarding solid transport dynamics, influencing the erosion – sedimentation equilibrium and transport in downstream stretches, the project principle is requested to define the area of direct and indirect influence for this component, including the activities of settling areas, artisanal and mechanical aggregate material extraction, and other uses of the watercourse.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the

watercourses, or on
tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.06 Sediment**

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum.**

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study** presented in **Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfal Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential expected solid streambed wear/entrainment (transport capacity) in the rivers, calculated based on the theoretical modeling of their hydraulic characteristics

- and theoretical numerical relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (AGU.06.01), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted.

It can be concluded that the Maipo River system can be managed such that, With the Project operational, present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them.

Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

AGU.06.04 Discharge effects

Water capture in advance of in-situ gravel removal leads first to a reduction in sediment load in water carried through the headworks to the turbine rooms, while the solid materials that is retained is returned to the river. At the point where water is discharged from the plants (Las Lajas area), water that has passed through the turbines - which contains a certain quantity of sediment - once again mixes with the water in the rivers, returning to its original conditions in terms of average sediment load (**Addendum, Section I, Question 28**).

At the point where water is returned to the Maipo River, in the Las Lajas area, there will be no degradation of the riverbed as it is composed entirely of rocks. It should be mentioned that the flow rate discharged from the PHAM at this point is always lower than the flow rate in the Maipo River just upstream.

During the operations phase of the Project, planned maintenance activities do not include any cleaning of tunnels and culverts. Inside the tunnels, the cross sectional area for water flow is small enough to prevent sedimentation. This is shown through the operation of the Alfalfa Plant for 20 years without any cleaning of the tunnels being included among maintenance activities.

The only operations that lead to the discharge of sediment are the discharge of gravel traps at the inlets, and the flushing of the sand traps, returning sediment to the river once a certain volume has built up within them. These operations are conducted intermittently and for short time periods (1 minute for sand traps, 10 minutes for gravel traps), at variable frequency depending on the season. For more information see the **Addendum, Section IV, Question 3**.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water

abstracted from the
upper reaches of the La Engorda, Colina, Las Placas, and El Morado
Streams and the El Yeso River downstream of the El Yeso Reservoir, as well
as water from the

upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfafal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfafal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfafal I and Alfafal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

Remark N° 43

1. Tourism

- * The EIS underestimates not only the present importance of tourism in the district, but also its potential, associated with a lack of infrastructure; similarly, it fails to mention that the district's main attraction consists of its natural scenic beauty.
- * The Project Owner must indicate current and potential tourism demand in the region, in both qualitative and quantitative terms.
- * Determine tourism service availability in the context of demand.
- * Describe and classify the tourism companies with special interests considered in the district, and the promotion of tourism service provision in the area.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent

decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **TUR Tourism**

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 44

2. Environmental Damage and Impact on Tourism

- * The death of rivers, intervention in the El Morado Natural Monument, the heaping up of 2,700,000 million m³ of muck, etc., are not cosmetic effects. Under Law 19,300, Art. 2, Part c, it is stated that "Environmental damage [means] any significant loss, decline, detriment, or harm caused to the environment, or to one or more of its components"
- * The Project Owner must define and distinguish between cosmetic effects and environmental damage.
- * Environmental damage will lead to a negative effect on tourism through the loss of landscape value and the absence of the area's typical ecosystems.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to

support outreach and awareness building of the District of San José de Maipo as a national tourism resource. Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents. F&F Biodiversity Impact**

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neopteris curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Liolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopus cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

F&F.02.02 Form of mitigation

Aquatic flora and fauna

The Project calls for a suite of multi-purpose environmental management measures that aim to minimize its effects on living organisms, including: minimization of watercourse areas to be subject to intervention by prioritizing such works for late summer and early fall seasons (period of lowest flow rates), the adoption of special precautions to prevent accidental spillages into watercourses (prohibition of the storage of lubricant drums in or near watercourses, etc), and permanent maintenance of ecological flow rates.

For more detailed information, including technical documentation that complements the information described above, see Annex 17 of the Addendum.

Terrestrial Flora and Vegetation

In order to prevent and/or minimize the Project's effects on plant life, it plans to adopt a number of integrative measures: micro-routing in advance of starting work on-site, in order to identify specimens of plants listed in any conservation category and subject to impact; compensation with the planting of 10 specimens for every one destroyed, in the case of non-woodland species listed for conservation; implementation of a woodland management plan applicable to woodland areas, which describes its measures in accordance with Article 5 of the Woodland Law; implementation of vegetation restoration plans at muck disposal sites, encampments, artificial slopes, and tunnel access terraces (EIS, Annexes 7 and 29). More in-depth information on complementary measures is provided in Annex 6 of Addendum 1.

Terrestrial fauna

Specific wildlife environmental management measures have been proposed for each particular species, taking into account prior experience in the success of these measures in similar projects. These measures will be implemented in continual coordination with the Servicio Agrícola y Ganadero. Principal measures include: capture of individuals belonging to species of conservation interest for rescue and relocation; controlled perturbation actions; and habitat replacement. Other measures are based on the use of signage, training for Contractors, and contractual requirements for on-site supervision (see details in Section 6.4.1.6 of the EIS). See Annex 4 of the Addendum for the native wildlife rescue and relocation plan.

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.01 River sports

During the operations phase, the activities of the PHAM shall not directly or indirectly interfere with tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. Furthermore, the PHAM shall have no significant effect on boating activities on the Maipo River as a result of reductions in river flow rate; an analysis is presented in Annex 17 of the Addendum modeling a number of hydrological scenarios (1), concluding that the PHAM shall not affect the current situation in rafting and kayaking activities conducted in the area between San Gabriel and San José de Maipo.

In order to establish an analysis comparing the current Maipo River boating situation with predictions for the situation with the Project operational, the variables of flow rate, river width, and water depth were modeled, as valid indices to establish conditions for boating activities on the Maipo River.

This analysis showed that the Project shall not interfere with tourism activities conducted on the Maipo River, in view of estimates that in a dry year, the magnitude of variations in flow rate and water depth will not cause interference with boating activities.

For more information, see **Annex 17 of Addendum 1**.

- (1) The hydrological analysis used to evaluate reductions in flow rate is based on a statistical record going back 50 years, thus ensuring that seasonal and annual variations are incorporated into the analyses conducted.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training,

advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the

possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

TUR.03 Visual impact

The Project is to be located, taking into account esthetic and perceptual considerations and emphasizing the characterization and appraisal of the issues of visibility, quality, and visual fragility of the landscape.

In terms of Landscape Alteration or Landscape Impact associated with this infrastructure project, potential effects are classified as either limited duration - generally applying during the construction phase - or permanent, for effects that shall persist during the operations phase and continue throughout the working life of the Project. A qualitative methodology is used to study these effects, whereby the first phase consists of identifying sources of visual impact, and the second phase relates to identifying and classifying environmental impacts.

As a general rule, it is assumed that impact on the landscape during the construction phase shall be temporary, mainly due to the transitory nature of the sources of impact, the low level of prior human activity in certain areas, and the relatively low level of physical and visual accessibility of a significant proportion of the area subject to intervention.

As most of the Project construction works will be situated underground, during the operations phase the main visual signatures of its existence will be the intakes and access roads.

For further information on the methodology used for landscape impact assessment, see **Chapter 6, Section 6.1.4.10 of the EIS, and Annex 17 of**

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayes, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions. The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS**.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

Remark N° 45

3. Watercourses Subject to Intervention

- * Given that, in view of its characteristics and natural monuments, the Cajón del Maipo valley has been declared a ZOIT Zone of National Interest, the Project Owner is requested to analyze and evaluate to what extent the impacts to be generated by the PHAM in the area subject to intervention are compatible with the district's role as a tourism destination.
- * The AES Gener Colorado River installations abstract 100% of water from the Maitenes, and the company agrees to maintain an ecological flow rate of 0.7 m³/second, allowing the river to dry out almost completely. This situation is not, as AES Gener would have it, "a merely cosmetic effect visible from certain points", but rather leads to serious consequences affecting the area's tourism and economy. The entire south-east riverbank is an area with many scenic areas, and its natural beauty brings in a large influx of persons throughout the year. The Colorado Valley does not, as Gener states, require tourism infrastructure in order to be visited; Chilean and foreign tourists come to the Cajón del Maipo in search of our natural world. A trail winds along the length of the river, where hikers can find crofters' cottages selling goat cheese, viewpoints looking out over the river, places where condors can be sighted, horse riding routes, native woodland, sites where UFOs are said to be seen, and endemic flora and wildlife, all in a harmonious riverside ecosystem that is now going to disappear.
- * The same situation occurs once again in the El Morado Stream, which will be left with a flow rate of 0.24 m³/second, the La Engorda Stream with 0.2 m³/second, the Colina Stream with 0.3 m³/second, and the Las Placas Stream with 0.14 m³/second. If these ecological flow rates are permitted, these watercourses will dry out. This will lead to the disappearance of their ecosystems as well as their landscape and recreational value.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal.

Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual

Remark N° 66 Units of Measurement

The Environmental Impact Study should present all relevant figures on flow rates in a single unit of measurement, permitting clear comparison between the flow rates that the project plans to abstract as against the flow rates that exist in each river in each area of each valley that will be affected, from the Valle de las Arenas through to El Manzano.

It shows a lack of rigor to present some figures in liters per second (l/s) and others in cubic meters per second (m³/s).

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components

(stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a

conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **F&F Biodiversity Impact**

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3**, and **Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes

the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neoporteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo Spinolosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Lilolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

SUE.02 Soils, meadows, and wetlands

The Project Owner has conducted a number of studies with the aim of characterizing the vegetation of summer grazing areas (La Engorda) (see details in Addendum 1, Annex 6, and in Chapter 5 of the EIS), as well as flora and vegetation studies in the Project's area of influence (EIS, Chapter 5).

These studies contain information compiled in fieldwork campaigns conducted in Fall 2005, Spring 2006, November 2007, March 15 and 16, 2008, and September 2008, which add to the body of knowledge available regarding vegetation in these areas.

The Lo Encañado area shall be assigned a status of controlled access area for works contractors at all times: it shall not be subject to any intervention whatsoever. For more information on vegetation areas that could be affected by the construction works, and to learn about mitigation measures proposed by the Project Owner, you are advised to review Annex 42 of the EIS and Annex 6 of the Addendum.

With regard to environmental regulations that apply specifically to vegetation and plant life, the Project Owner shall be subject to: **Supreme Decree 366** (Exploitation of Tamarugo, Carob, Chañar, Guayacán, Aextoxicon, Charcoal, Acacia, Boldo, Maiten, Litre, Bollen, and Quillay). This legal instrument governs the felling of trees and bushes.

Supreme Decree 4363 and D.L 701 (Approving the Definitive Text of the Law on Woodland and Regulations on Forest Promotion).

Article 2 of the Woodland Law establishes an obligation that land classified as for preferential woodland land use, as well as natural and artificial woodlands, are subject to woodland management plans approved by the National Forestry Commission (CONAF). Furthermore, Article 21 of Decree Law 701 establishes that any felling or usage of native woodland shall be subject to the CONAF's prior approval of the corresponding management plan.

Decree 82 (Prohibiting the Felling of Trees and Bushes in Indicated Andean High Mountain and Foothill Areas)

Article 102 Sector Environmental Permit (Permit for the felling or exploitation of native woodland, in any type of land, or plantations located in land with preferential characteristics for woodland use).

For further information and analysis on the aforementioned regulations and permits, as applicable to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see Sections 3.2.6 and 3.3.7 in Chapter 3 of the EIS.

TUR Tourism

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district;

that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of

natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán. For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.01 River sports

During the operations phase, the activities of the PHAM shall not directly or indirectly interfere with tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. Furthermore, the PHAM shall have no significant effect on boating activities on the Maipo River as a result of reductions in river flow rate; an analysis is presented in Annex 17 of the Addendum modeling a number of hydrological scenarios (1), concluding that the PHAM shall not affect the current situation in rafting and kayaking activities conducted in the area between San Gabriel and San José de Maipo.

In order to establish an analysis comparing the current Maipo River boating situation with predictions for the situation with the Project operational, the variables of flow rate, river width, and water depth were modeled, as valid indices to establish conditions for boating activities on the Maipo River.

This analysis showed that the Project shall not interfere with tourism activities conducted on the Maipo River, in view of estimates that in a dry year, the magnitude of variations in flow rate and water depth will not cause interference with boating activities.

For more information, see **Annex 17 of Addendum 1**.

- (1) The hydrological analysis used to evaluate reductions in flow rate is based on a statistical record going back 50 years, thus ensuring that seasonal and annual variations are incorporated into the analyses conducted.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

TUR.03 Visual impact

The Project is to be located, taking into account esthetic and perceptual considerations and emphasizing the characterization and appraisal of the issues of visibility, quality, and visual fragility of the landscape.

In terms of Landscape Alteration or Landscape Impact associated with this infrastructure project, potential effects are classified as either limited duration - generally applying during the construction phase - or permanent, for effects that shall persist during the operations phase and continue throughout the working life of the Project. A qualitative methodology is used to study these effects, whereby the first phase consists of identifying sources of visual impact, and the second phase relates to identifying and classifying environmental impacts.

As a general rule, it is assumed that impact on the landscape during the construction phase shall be temporary, mainly due to the transitory nature of the sources of impact, the low level of prior human activity in certain areas, and the relatively low level of physical and visual accessibility of a significant proportion of the area subject to intervention.

As most of the Project construction works will be situated underground, during the operations phase the main visual signatures of its existence will be the intakes and access roads.

For further information on the methodology used for landscape impact assessment, see **Chapter 6, Section**

6.1.4.10 of the EIS, and Annex 17 of Addendum 1.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayes, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions.

The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS**.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

Remark N° 46

4. Impact on the El Manzano Area

- * The El Manzano Channel intake is linked to the Colorado River's hydrological system, providing irrigation water to the 292 hectare area that makes up the El Manzano area.
- * Due to the decline in flow rate in the river, works must be constructed in order to permit the abstraction of water over which rights are held, yet the company AES Gener refuses to enter into any kind of economic agreement relating to the maintenance of these installations, leaving the community economically and technically responsible for maintaining its irrigation system. If this problem is not solved, El Manzano will become a desert, rather than the green pasture that it is today. This will certainly affect all trade and the area's tourism companies, as they are absolutely dependent on keeping their surroundings green.
- * The Project Owner is requested to attach a layout map of the companies present in this area, fruit orchards, plant nurseries, camp sites, picnic areas, restaurants, bee keepers, producers of jams/jellies and nuts and nuts or dried fruits, animal feed plants, etc, which directly or indirectly depend on irrigation water for their production processes or additional value added.
- * Attach a layout map of properties that depend on irrigation water to maintain their scenic value.
- * Establish a system of compensation to mitigate the impact leading to declines in property values and in quality of life.

Thematic responses

Specific response

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4 in Chapter 2 of the EIS**.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that is, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**).

AGU.02.02 “Hanging” channels

Gener has repeatedly issued declarations that it is aware that not only the works that it

shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by

community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.03 Decline in land value

Road conservation activities planned shall not involve urban areas. Road conservation activities shall be implemented mainly along mountain roads, particularly on the Alto Volcán area and El Yeso Reservoir access routes (Route G-25 and Route G-455, respectively).

Road widening actions are not planned, given that, according to the Project's Basic Engineering Studies, the roads subject to conservation works have a wide enough roadway for the passage of trucks, as defined by the Highways Department; therefore, no expropriation of land will take place.

With regard to land values, it can be stated that lots located alongside Route G-345 have increased in value significantly with the development of the access route to Maitenes and Alfalfal.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. In parallel, the study investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

Remark N° 47

5. Labor Hiring

The Project Owner overestimates job creation, whereas the contractor and not the company itself shall be in charge of hiring. Gener must:

- * Quantify the amount of labor that it shall hire in the district.
- * Describe the positions to be filled.

* Establish a binding agreement between the Project Owner and the Municipal Government whereby Gener agrees to source 100% of the persons who have registered at the labor brokerage office.

Thematic responses

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.01 Jobs in the District

Local labor availability is estimated based on figures from the Labor Brokerage and Information Office. This information will be made available to construction contractors so that they can preferentially hire local workers. According to information compiled at the Project Office in San José de Maipo, the project has registered a total of 980 potential project workers, of whom 390 are unemployed, broken down as follows:

Mine workers:	105
Carpenters, Builders, and Rebar Layers:	157
Heavy Machinery Operators:	131
Non-specialized day laborers:	39
Drivers:	87
Specialized technical personnel:	60
Welders:	26
Foremen and supervisors:	7
Graduate professionals:	20
Cleaning, security, and canteen workers:	120
Administrative personnel:	91
Other, misc.:	139

The average project workforce during the construction phase (5 years) is estimated at 2000 persons, and during the Citizen Participation process the company has agreed to ensure that an average of at least 500 local persons will be on the payroll during the construction of the Project.

SOC.01.01 Requirements

In view of the characteristics and scale of the Project, personnel with specific qualifications will be required for the operation and maintenance of plant machinery and equipment, during the operations phase. Conversely, during the Project Construction Phase, it is projected that labor requirements will create jobs not only for mining workers, but also for machinery operators, drivers, and both skilled and unskilled construction personnel, the latter working mainly as day laborers and assistants.

The population of the Project's area of direct influence has been found to possess levels of training and specialization (occupation as defined under the CIIU code) that shall permit them to access both skilled and unskilled work positions created by the Project.

SOC.01.02 Working conditions

To date no schedule exists specifying labor requirements for the full duration of the construction phase. Detailed information specifying jobs created under average and peak labor requirements, broken down by labor requirement dynamics for each encampment, will only be available once the Project Owner has tendered the works contracts.

During the operations phase, it is expected that personnel requirements will amount to approximately 80 positions available, required for power plant operations and maintenance activities. Unlike work positions created during the construction phase, the jobs created in the operations phase will be permanent (EIS, Chapter 6, Section 6.4.2.4).

The Project Owner will provide for coordination between the construction works contractors, the Labor Brokerage Office, and the Municipality of San José de Maipo, regarding local labor required and jobs sought. The PHAM has accepted a commitment to incentivize works contractors to prioritize local contracting of labor required.

No prior training is planned in advance of the Construction Phase. However, such training will form part of the programs implemented in the more advanced phases of the project.

Remark N° 48

6. Maitenes Foundation

The funds that Gener is offering to finance education and tourism projects should not be handled by its Maitenes Foundation. A foundation should be formed that is external to the company, representing not only Gener but also the principal community organization in the district, and the Municipal Government.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

CAL.02 Education

A goal of the Maitenes Foundation relates to education for children and young people against the backdrop of the natural environment (for more information on the goals and achievements of the Foundation, see Annex 26 of the EIS).

Gener firmly believes that contributions to the technical and vocational education and training of young people must keep sight of real employment possibilities. Therefore, as a first initiative it has earmarked resources for an education improvement project in the district, which will contribute to establishing education management for the restructuring of the school curriculum and professional technical capacity building, taking into account the features needed to boost local employability. Based on information and recommendations from this study, Gener, acting through the Maitenes Foundation, will undertake a Capacity Building for Employability Program fundamentally oriented towards those whose family, social, or economic situation has barred them from completing their education and training, or acquiring the skills needed in order to find work.

Remark N° 49

7. Supply Purchase Agreements

The Project Owner overestimates the benefit that will be generated for the community through the purchase of supplies and the presence of 20 encampments.

The Project Owner should enter into a binding agreement with the SJM Chamber of Commerce and Tourism, agreeing that all supplies required in the functioning of the encampments shall be acquired in the district.

Thematic responses

Specific response

The Project owner is not able to agree to this request because it goes against the concepts of free competition, and it is also unable to oblige contractors to purchase their supplies in the district.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

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The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

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The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent

decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.05 Promoting entrepreneurship

The company has agreed to use its **Fundación Maitenes** foundation to set aside an **annual fund over a 10 year period starting in 2010**, to support local residents who formulate tourism development business plans for implementation in the area. These projects will be financed through funds open for competitive tenders; submissions will be evaluated on their own merit by a council of community representatives, which will select which projects will be funded.

The initiative to be implemented by the Fundación Maitenes may be linked to projects in progress run by public institutions and services in the district, related to the two lines of action that the foundation has agreed to support. This linkage may help to strengthen state-run initiatives and foster sustainability over the course of time for the actions supported by the foundation, during the period in which the program is active.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. In parallel, the study investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 50**8. El Morado Natural Monument**

- * The construction and operation of the El Volcán Tunnel underneath the El Morado Natural Monument (a SNASPE site) is not compatible with the environmental conservation objectives defined in legal instruments in force in the country.
- * This should not be evaluated as an environmental impact, but rather in terms of requirements stipulated in conservation legislation.

Thematic responses**ARQ Archeological and
Paleontological Sites: Heritage**

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1)

Chapter 3 of the EIS provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

Remark N° 51

9. Characterization of Impact on the El Morado Natural Monument

Environmental impact should be characterized with regard to:

- * The rate at which damage occurs, with the aim of modeling regeneration capacity.
- * The extent to which the impact is irreversible, and the damage universal. This impact affects not only a specific location, but also the nation's heritage.

Thematic responses

Specific response

The PHAM shall have no effect on the El Morado Natural Monument as its presence in this area will be limited to a tunnel passing under the area at a great depth.

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

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For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material
- b) creation of a viewpoint
- c) fossil trail

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas,

Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

PRO.03.02 Tunnels

The majority of the Project is planned for installation underground. The general characteristics of the tunnels are described in Chapter 2 of the EIS, Table 2.2.5 (for detailed geological information on the path taken by the tunnels, see Annex 46 of the EIS).

For an evaluation of the impact and environmental management measures associated with underground installations, see Chapter 6 of the EIS.

Annex 45 of the EIS, Hydro-Geology of Underground Works, presents a general description of the geological conditions that are expected to be found along the lengths of the tunnels; expected permeability based on geological knowledge and hydro-geological conditions in the area, incorporating experience gained during the construction of tunnels for the Alfalfal Plant, which has been operative for more than 17 years; as well as a description that includes the design of the tunnels, providing a brief explanation of the methods to be used to reduce and control water seepage.

With regard to the impact of the path taken by the tunnel passing underneath the El Morado Natural Monument, and measures to be taken to respect the area, see Section I, Responses 4, 5, and 6, in the Addendum.

Remark N° 52

Labor Hiring

The contractor and not the company itself shall be in charge of hiring. Gener

- must: a) Quantify the amount of labor that it shall hire in the district.
b) Describe the positions to be filled.

c) Establish a binding agreement between the Project Owner and the Municipal Government whereby Gener agrees to source 100% of the persons who have registered at the labor brokerage office.

Thematic responses

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.01 Jobs in the District

Local labor availability is estimated based on figures from the Labor Brokerage and Information Office. This information will be made available to construction contractors so that they can preferentially hire local workers. According to information compiled at the Project Office in San José de Maipo, the project has registered a total of 980 potential project workers, of whom 390 are unemployed, broken down as follows:

Mine workers:	105
Carpenters, Builders, and Rebar Layers:	157
Heavy Machinery Operators:	131
Non-specialized day laborers:	39
Drivers:	87
Specialized technical personnel:	60
Welders:	26
Foremen and supervisors:	7
Graduate professionals:	20
Cleaning, security, and canteen workers:	120
Administrative personnel:	91
Other, misc.:	139

The average project workforce during the construction phase (5 years) is estimated at 2000 persons, and during the Citizen Participation process the company has agreed to ensure that an average of at least 500 local persons will be on the payroll during the construction of the Project.

SOC.01.01 Requirements

In view of the characteristics and scale of the Project, personnel with specific qualifications will be required for the operation and maintenance of plant machinery and equipment, during the operations phase. Conversely, during the Project Construction Phase, it is projected that labor requirements will create jobs not only for mining workers, but also for machinery operators, drivers, and both skilled and unskilled construction personnel, the latter working mainly as day laborers and assistants.

The population of the Project's area of direct influence has been found to possess levels of training and specialization (occupation as defined under the CIIU code) that shall permit them to access both skilled and unskilled work positions created by the Project.

SOC.01.02 Working conditions

To date no schedule exists specifying labor requirements for the full duration of the construction phase. Detailed information specifying jobs created under average and peak labor requirements, broken down by labor requirement dynamics for each encampment, will only be available once the Project Owner has tendered the works contracts.

During the operations phase, it is expected that personnel requirements will amount to approximately 80 positions available, required for power plant operations and maintenance activities. Unlike work positions created during the construction phase, the jobs created in the operations phase will be permanent (EIS, Chapter 6, Section 6.4.2.4).

The Project Owner will provide for coordination between the construction works contractors, the Labor Brokerage Office, and the Municipality of San José de Maipo, regarding local labor required and jobs sought. The PHAM has accepted a commitment to incentivize works contractors to prioritize local contracting of labor required.

No prior training is planned in advance of the Construction Phase. However, such training will form part of the programs implemented in the more advanced phases of the project.

Remark N° 53 Maitenes Foundation

The funds that Gener is offering to finance education and tourism projects should not be handled by its Maitenes Foundation. A foundation should be formed that is external to the company, representing not only Gener but also the principal community organization in the district, and the Municipal Government.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

CAL.02 Education

A goal of the Maitenes Foundation relates to education for children and young people against the backdrop of the natural environment (for more information on the goals and achievements of the Foundation, see Annex 26 of the EIS).

Gener firmly believes that contributions to the technical and vocational education and training of young people must keep sight of real employment possibilities. Therefore, as a first initiative it has earmarked resources for an education improvement project in the district, which will contribute to establishing education management for the restructuring of the school curriculum and professional technical capacity building, taking into account the features needed to boost local employability. Based on information and recommendations from this study, Gener, acting through the Maitenes Foundation, will undertake a Capacity Building for Employability Program fundamentally oriented towards those whose family, social, or economic situation has barred them from completing their education and training, or acquiring the skills needed in order to find work.

Remark N° 54

El Manzano Environmental Impact Study

The EIS presented by Gener does not include impact that will be generated by the PHAM at El Manzano. The

EIS should include:

1. Identification, prediction, interpretation, mitigation plan, and evaluation of the impact that will be caused, particularly with regard to irrigation systems.
2. Actions that shall be taken to mitigate the significant negative impacts that will be generated by the PHAM.

Thematic responses

Specific response

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in **Chapter 2 of the EIS**.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 channels

"Hanging"

Gener has repeatedly issued declarations that it its aware that not only the works that it

shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

**PRO.02 EIS Additional and
Complementary Information**

In accordance with consultation procedures conducted by oversight services, further studies and information have been incorporated into Addendum 1, which complements existing information provided in the EIS. Regarding ecological flow rates (**Annex 17**), cultural heritage (**Annex 14**) and the management of summer grazing areas (**Annex 6**).

Remark N° 55 Irrigation User Organizations: El Manzano Channel and Maurino Channel

In view of the drop in water flow in the Colorado River, irrigation user organizations will find it impossible to abstract the quantities of water to which they have rights.

1. The Project Owner should include the construction of such installations as shall be necessary to avoid this impact, and the commitment that has been expressed to defray all costs arising through the construction and maintenance of these installations.
2. The Project should include guarantees and compensation payable in the event that these organizations are rendered unable to abstract the water to which they hold rights.
3. The Project Owner should attach written consent by the "El Manzano Channel" and "Maurino Channel"

Thematic responses

Specific response

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in
**Chapter 2 of the
EIS.**

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

PRO.01.01 Compensation

The concept of compensation refers to the act of indemnifying damages or harm caused. Within the framework of the EIS, the Project Owner has issued a proposal to the competent authority regarding a suite of environmental management measures aiming to minimize, compensate, and restore the Project's impacts, making their implementation sustainable (Chapter 6 of the EIS).

In this regard, compensation is understood to be included in the spirit or end goal of the environmental management measures proposed by the Project Owner, following the evaluation of the direct and indirect effects of the PHAM on each of the environmental components stipulated in Supreme Decree 95, SEIA Regulations.

Remark N° 56 Colorado River EIS

- * The impact to arise as a result of the decline in flow rates in the Colorado River is not a cosmetic effect that is justified through the absence of tourism-related infrastructure.
- * The Project Owner must provide documented background information forming the grounds for the prediction, identification, and interpretation of the impact that these actions shall cause.
- * It should also describe the actions that it shall take in order to prevent or minimize all significantly negative effects.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services. For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

AGU.04.04 Monitoring and control of flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention

under the PHAM consists of maintaining an ecological flow rate (Q_e) approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility
(Addendum, Section 5,

Question 2).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Eastings	Northings
	Alto Volcán		
	Stream gauge station		
	406,157	6,259,100	
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum.CAL Impact on Quality of Life**

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plant (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as

they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be

increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfafal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **PRO.01.01 Compensation**

The concept of compensation refers to the act of indemnifying damages or harm caused. Within the framework of the EIS, the Project Owner has issued a proposal to the competent authority regarding a suite of environmental management measures aiming to minimize, compensate, and restore the Project's impacts, making their implementation sustainable (Chapter 6 of the EIS).

In this regard, compensation is understood to be included in the spirit or end goal of the environmental management measures proposed by the Project Owner, following the evaluation of the direct and indirect effects of the PHAM on each of the environmental components stipulated in Supreme Decree 95, SEIA Regulations.

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.01 River sports

During the operations phase, the activities of the PHAM shall not directly or indirectly interfere with tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. Furthermore, the PHAM shall have no significant effect on boating activities on the Maipo River as a result of reductions in river flow rate; an analysis is presented in Annex 17 of the Addendum modeling a number of hydrological scenarios (1), concluding that the PHAM shall not affect the current situation in rafting and kayaking activities conducted in the area between San Gabriel and San

José de Maipo.

In order to establish an analysis comparing the current Maipo River boating situation with predictions for the situation with the Project operational, the variables of flow rate, river width, and water depth were modeled, as valid indices to establish conditions for

boating activities on the Maipo River.

This analysis showed that the Project shall not interfere with tourism activities conducted on the Maipo River, in view of estimates that in a dry year, the magnitude of variations in flow rate and water depth will not cause interference with boating activities.

For more information, see **Annex 17 of Addendum 1**.

- (1) The hydrological analysis used to evaluate reductions in flow rate is based on a statistical record going back 50 years, thus ensuring that seasonal and annual variations are incorporated into the analyses conducted.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 57

Ecological flow rate: Colorado River

- * The ecological flow rate should be defined by the DGA, not by the Project Owner
- * The point where this flow rate is to be measured and monitored should be sited at the mouth of the Colorado River.
- * Flow rate monitoring should include the participation of outside agencies, that are not hired by the company.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of**

flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Q_e) approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Northing	Easting
	Alto Volcán	406,157	6,259,100
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 58 Yeso River EIS

- * Gener holds rights over water in the Yeso River amounting to 15 m³/sec. These rights were granted without ecological flow rate requirements. The Project plans to abstract 15 m³/sec of water 700 m downstream of the reservoir. An impact that leads to the death of a river is not a cosmetic effect, as the Project Owner would have it:
- * The Project Owner must provide documented background information forming the grounds for the prediction, identification, and interpretation of the impact that implies the death of the Yeso River.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4**

in Chapter 2 of the EIS.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been

conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs,

zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
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	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
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	El Sauce		
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	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 59

Ecological flow rates: Colina, Engorda, Las Placas, and El Morado Streams

* The flow rates proposed by the Project Owner would alter conditions in the watercourse, impede the development of living components of the ecosystem (plants and animals), and would affect the dynamics and functioning of the ecosystem.

* The Project Owner should describe the actions that it shall take in order to mitigate all significantly negative effect resulting from declines in flow rate.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of

the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

AGU.04.04 Monitoring and control of flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Q_e) approved by the DGA. In the case of the PHAM,

the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses. Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

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Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán	Stream gauge station	6,259,100
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

F&F Biodiversity Impact Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02.01 Impact Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to

intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly

reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

Remark N° 60

Effects on the Quality of Life in the Baños Morales Community

It is stipulated in Law 19,300, Article 11, parts d and e:

Projects or activities shall require the preparation of an Environmental Impact Study if they generate or lead to at least one of the following effects, characteristics, and circumstances:

- a) Localization close to a settlement or protected natural resources subject to impact, as well as the environmental value of the area in which they are planned to be implemented;
- b) Alteration of the area's landscape or tourism value, of significant magnitude or duration.

No part of the EIS prepared by AES Gener makes reference to the human impact that this project shall cause affecting the quality of life in the settlement of Baños Morales, with the installation of an encampment housing 500 persons close to the community, under circumstances that by law require the preparation of an Environmental Impact Study.

It is therefore requested that the corresponding study be conducted, in order to determine the concrete way in which we as a community shall be affected.

Thematic responses

Specific response

There shall be no direct impact in the settlement of Baños Morales as there shall be no encampments or traffic flow close to the area.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the

dynamism of all activities in the District of San José de Maipo; iii)
Improvement in quality of life for many families, as family members
return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.02 Human contingent presence

The presence of Project employees will be temporary (limited both to the years of the construction phase, and to the working day organized into shifts), thus disincentivizing them and their families from moving to the area on a permanent basis. During the Project's construction phase, its employees shall sleep in the encampments described in the documentation, not making use of existing hotels and hostels located in and near the area's settlements.

Once the construction phase has been completed, the Project's installations and encampments shall be removed; they shall therefore not become part of existing settlements, or form new centers for the formation of settlements.

The PHAM plans call for the creation of 5 encampments, located away from settlements. These encampments will be operated as described in Annex 33, and each will house a permanent contingent of 200-400 employees, under the standard working regime adopted by mining installations. The transport of employees from the encampments to their places of residence shall have a frequency determined in accordance with the working shifts. Therefore, it is important to understand that under no circumstances shall the presence of Project employees in the area lead to the type of interaction with

the resident community and demand for local services that currently occurs as a result of the flow of tourists and visitors, mainly during weekends, holidays, and the summer season.

In view of the above, the Project shall not lead to the following potential impacts: overpopulation at a local or district level (in existing settlements); or effects modifying local customs, economic service provision activities, connectivity, and local load capacity (understood to refer to the load placed on infrastructure and equipment).

As indicated in Annex 39 of the EIS, documentation supporting the analysis described above shall form part of activities under the Social Indicator Monitoring (SIM) program. This monitoring program is based on compiling information using qualitative and quantitative techniques developed in the field of Social Sciences, oriented towards investigating a suite of indices that pay due heed to trends in relevant variables for monitoring, selected in accordance with the characteristics of the Project and of the communities in the area where it is to be implemented. Reports will be issued twice per year containing the results obtained, including the use of graphical aids to show comparative changes in parameters from one study campaign to the next. This document will be delivered to CONAMA.

In general, by gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project may cause in its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities.

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.03 Visual impact

The Project is to be located, taking into account esthetic and perceptual considerations and emphasizing the characterization and appraisal of the issues of visibility, quality, and visual fragility of the landscape.

In terms of Landscape Alteration or Landscape Impact associated with this infrastructure project, potential effects are classified as either limited duration - generally applying during the construction phase - or permanent, for effects that shall persist during the operations phase and

continue throughout the working life of the Project. A qualitative methodology is used to study these effects, whereby the first phase consists of identifying sources of visual

impact, and the second phase relates to identifying and classifying environmental impacts. As a general rule, it is assumed that impact on the landscape during the construction phase shall be temporary, mainly due to the transitory nature of the sources of impact, the low level of prior human activity in certain areas, and the relatively low level of physical and visual accessibility of a significant proportion of the area subject to intervention.

As most of the Project construction works will be situated underground, during the operations phase the main visual signatures of its existence will be the intakes and access roads. For further information on the methodology used for landscape impact assessment, see **Chapter 6, Section 6.1.4.10 of the EIS, and Annex 17 of Addendum 1.**

Remark N° 61

Transmission lines

Under Article 10 of Law 19,300: Projects or activities that may cause an environmental impact, during any of their phases, and which are subject to the environmental impact evaluation system, are as follows:

- a) High voltage electricity transmission lines and associated substations.
- b) The EIS prepared by Gener makes no mention whatsoever of the impact to be caused by the temporary high voltage electricity lines that will run from Route G-25 to the encampment located in the La Engorda Valley, or the permanent lines that will run from Route G-25 to each of the intakes located in that Valley.

The study is not complete.

Thematic responses

ELE Electrical Installations

The electrical installations presented in the EIS comprise the substation, to be located in the El Sauce area, the characteristics of which are to be found in **Annex 27 of the EIS**; given that the electricity transport layout (cabling and towers) is to be presented to the Environmental Impact Assessment System once all background information is available.

ELE.03 Transmission lines

In view of the project's location, close to Santiago, it is expected that the distance covered by the definitive cabling layout will be short, involving a minimum of sectors not subject to prior intervention. With regard to the specific location of the cabling layout, plans call for the use of the existing high tension power line used by the Queltehues, Volcán, and Maitenes Plants.

Once the layout of the high tension power line has been defined, the Project Owner will submit this plan to the Environmental Impact Assessment System, in accordance with legislation in force. In line with the development of the Compliance Plan for environmental legislation applicable to the Project, the General Regulations applicable in this instance are indicated below:

Decree with Force of Law N°4, dated 05 February, 2007, setting forth the Recast, Coordinated, and Systematized Text of the General Law on Electrical Services.

The General Law on Electrical Services governs the generation, transmission, distribution, and regimen of concessions and tariffs applicable to electrical energy, and the functions of the State with regard to these areas.

Supreme Decree N° 327, Regulations Regarding the General Law on Electrical Services

The Regulations Regarding the General Law on Electrical Services establish, in their 8th Article, that hydroelectric power plants, electrical substations, and transmission lines may be installed without making a request for a concession, when the interested party wishes. These concessions may be provisional (in order to study projects) or definitive. A definitive concession is granted by a supreme decree issued by the Ministry of the Economy, by order of the President of the Republic. Permits relating to electrical installations that do not require concessions are granted by the corresponding Municipal Governments.

For further information and analysis on the aforementioned regulations, with regard to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see **Sections 3.1.6 and 3.1.7 of Chapter 3 of the EIS**, where more detailed versions of this information can be found.

Remark N° 62 Legal Framework, Actions to be Taken to Comply with Regulations in Force

During the evaluation of the possible environmental impact that would arise through the implementation of the Project, it is necessary to bear in mind the legal framework in which it will exist, and which affects the area where construction is to take place. The relevant legislation is:

Ministry of Mining Supreme Decree 78, which declares the area of the Cajón del Maipo as an "area of scientific interest for mining purposes", including statements that:

"... The area is found to be a natural biodiversity reserve of international interest, and it provides significant ecosystem services to the Metropolitan Region, such as the storage and supply of fresh water for irrigation and human consumption. It also forms part of an area of interest for tourism and cultural interests, making possible environmental education and with scientific potential, as well as cultural and archeological riches. Thirdly, the real protection of this area will permit proof of compliance with Free Trade Agreements, and will constitute compliance with international cooperation requirements".

The area is also protected under the Andean Santiago Action Plan, which declares the Cajón del Maipo as a "priority site for biodiversity conservation". This resolution underpins COREMA's commitment to treating the Cajón del Maipo valley as a protection priority.

Considering that these two documents clearly espouse the State's commitment to the protection of this area, as its protection even permits accreditation and compliance with Free Trade Agreements, meaning that any disaster that might occur would affect not only the area itself but also would probably harm international relations, in terms of both trade and other areas.

Weighted consideration must therefore be given to the potential dangers that could affect the country through non-compliance with this commitment - dangers that could affect the economic, environmental, social, cultural, and political spheres. The Environmental Impact Study includes some of these aspects, but this point should be analyzed in greater depth, and evaluating all potential consequences.

Similarly, the actions that AES Gener plans to take in order to comply fully with the aforementioned legal requirements should be explained.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

AGU.01 Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum**.

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**F&F Biodiversity Impact
Flora and Fauna**

The study conducted found evidence of the presence of 258 species of

plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.01 Regulations

The Project Owner shall comply with all legal environmental and sector-based regulations and requirements in force and applicable to the Project during the different phases of its development. The Project Owner has guaranteed compliance with the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and compliance with sector environmental permits.

Environmental regulations that apply to the Project have been identified based on its activities' potential environmental impacts affecting flora and fauna.

The full extent of these regulations is included in **Chapters 3 and 4 of the EIS, and in Section 2, Question 1 in Addendum 1.**

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1)

Chapter 3 of the EIS provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

Remark N° 63 Social and Environmental Impact

Impacts associated with the abstraction of large quantities of water must be evaluated in environmental terms and in terms of biodiversity.

The Environmental Impact Study should be expanded to include consideration of the social and environmental effects currently clearly shown in the different areas of the Cajón del Maipo Valley, and the predicted situation with the Project in operation during different seasons of the year. It is not sufficient simply to show numbers; this material should include photographs that clearly show the predicted situation with and without the Project's effects on flow rates in, for example, the Volcán River, the Colorado River, and the Maipo River, in different parts of the valley.

One effect that may be of use as an example is that, considering the predicted summer flow levels, it will be possible for persons and animals to cross the rivers by wading. Certain areas bordering the rivers currently use them as natural boundaries. In order to mitigate this situation and prevent passage on foot, consideration should be given to installing fencing along the full extent of the riverbanks, which would have an enormous effect downstream of the Project, in almost all of the Cajón del Maipo Valley - let alone the costs that AES Gener would have to bear.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water

quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality).

Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	Rain gauge station		Stream gauge station
	406,157		6,259,100
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

F&F Biodiversity Impact Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the

work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfa, Aucayes, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions.

The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS**.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

Remark N° 64
Siting, Tunnel Access, Encampments, Muck Disposal Heaps, and Intakes in the El Morado Area (Upper Volcán River)

Figure 2.2.1.2, from Chapter 2 of the EIS.

As shown in the figure, the location of the tunnel access, El Morado Stream Intake, Las Placas Stream Intake, Colina Stream Intake, La Engorda Stream Intake, and the site of Muck Disposal Heap 1, along with the corresponding encampment, together form an area of five (5) square kilometers where the construction activities and permanent operations of AES Gener will be located.

This area is crossed by a dirt road that has been in existence for years, and which is currently used by tourists traveling to the El Morado Glacier and El Morado Lake, a site of natural beauty and a tourist attracting that brings in many visitors, both Chilean and foreign.

This track is also used by mountain climbers, who engage in a variety of sports and training activities in the Mesoncito Valley and the Morado, Rubilla, Unión, Punta Italia, Punta Chile, Yamakawa, Mesón Alto, and Loma Larga mountains, as well as other nearby peaks.

AES Gener must clearly indicate the actions that it will take (if these installations are built) to allow these tourists to retain current conditions of free and zero-cost access - which is normally conducted on foot or on horseback, without requesting any permits of any kind from any institution or similar, without barriers or rangers requesting identification.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services

related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **TUR Tourism**

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in

Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayes, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions. The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS**.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

VIA.04 Damage to roads and trails

The level of intervention to be generated by the Project was determined based on levels of saturation and deterioration of service levels, arising as a result of vehicle traffic caused by the Project - this Project highway impact analysis therefore did not take into account wear and tear on the road surface, as this parameter is not relevant when truck traffic complies with weight limits established by the Ministry of Public Works' Highways Department. In this regard, the Project Owner will permanently supervise weight control, in order to ensure compliance with the stipulations made in Ministry Public Works Supreme Decree 158/1980 which establishes gross weight limits for highways, as well as Decree 200, dated July 1993 and Decree 396, dated November 1993, establishing gross weight limits for urban streets. In both cases vehicle weight may not exceed 45 tons. For more information on measures planned by the Project Owner to ensure compliance with these regulations, see specific information in **Chapter 3 of the EIS**.

Furthermore, the Project Owner plans to undertake the conservation of Route G-25 (El Volcán area) and Route G-455 to the El Yeso Reservoir. Details of the current condition of each of these routes and planned road conservation measures, see the Road Improvement Program, in **Annex 19** of the EIS.

Finally, in advance of the start of road conservation activities, the corresponding Projects were approved by the Santiago Metropolitan Region Regional Highways Department. With regard to areas of interest for tourism, the conservation of part of the highway network and year-round maintenance of the more remote stretches of Route G-455 to El Yeso and Route G-25 from El Yeso Bridge to the El Volcán area will improve accessibility, favoring an increase in influx of visitors or the arrival of visitors over lengthier periods of the year, as these areas are largely inaccessible to tourists for a significant part of the winter season.

VIA.05 Free transit

The PHAM shall not interrupt access by mountain climbers, hikers, or permanent or sporadic visitors who enter the area for leisure, sports, cultural activities, etc. For safety reasons, the PHAM will restrict access only to its installations and work sites. Similarly, there will be no restrictions on access to properties owned by third parties and used for livestock grazing; in other words, usage conditions in summer and winter grazing areas have always been subject to agreements between livestock herders and landowners, and this situation will not be modified by the Project.

Remark N° 65 Water Rights

The EIS should contain information on rights to all water to be diverted; these rights should be duly registered in the name of AES Gener, or supplemented with title deeds and assignment documentation covering the quantity of water described in the EIS.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

Management Plan that contributes to the neutralization of certain existing environmental liabilities.

AGU.04.04 Monitoring and control of flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility

(Addendum, Section 5, Question 2).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility

(Addendum, Section 5, Question 2).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	Stream gauge station		6,259,100
	406,157		
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 67 Determination of Ecological Flow Rates

Summer ecological flow rates (minimum annual flow rate) must be determined on a periodic basis by the Directorate General of Water (DGA), not by the Project Owner.

An ongoing study running over several years is necessary in order to determine ecological flow rates, taking into account variables such as rainfall patterns and seasonality of river flow; this study must be approved by the DGA.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs,

zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 68 Volcán River Water Abstraction

On page 3, paragraph 1 of the executive summary, it is stated that eleven (11) m³/s of water will be abstracted from the tributaries of the Volcán River (Engorda, Colina, Las Placas, and El Morado Streams); this could lead to enormous problems for the area, given that during at least eight (8) months of the year the average flow rate in the Volcán River, according to data obtained from the Directorate General of Water (DGA), is indicated to be close to ten (10) m³/s.

The EIS released by AES Gener ought to take into account the fact that this mountain river exhibits a variable flow regime, and the abstraction of a quantity greater than the quantity of water supplied by its tributaries from which it is captured would be completely unfeasible and dangerous, not only for the community and the environment but also for the Project itself.

This also indicates a lack of due attention to detail in the preparation of the EIS.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

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It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications

in the natural state of the hydrological system relate to the presence of the Alfafal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of

Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.02 EIS Additional and Complementary Information

In accordance with consultation procedures conducted by oversight services, further studies and information have been incorporated into Addendum 1, which complements existing information provided in the EIS. Regarding ecological flow rates (**Annex 17**), cultural heritage (**Annex 14**) and the management of summer grazing areas (**Annex 6**).

Remark N° 69 Future of the Works

In particular, the EIS should indicate what will be the fate of the tunnel and abstraction intakes after the 20 year lifespan of the Project has ended, this being the maximum reasonable time frame in view of the decline shown in the region - as can be verified in the abandonment of a number of lines (verify with Andacor and others). The EIS presents no reference to this situation or evaluation, showing a lack of rigor and concern for the future of the Project.

The Proyecto Hidroeléctrico Alto Maipo EIS should at the very least conduct all necessary studies at its own expense, over and above the general information contained in the EIS, presenting the results with proposals for the situation of replacing the Project's technologies with other systems that cause less damage to the physical and social environment. These conditions are required by communities in the area, and were specified and requested in a timely manner.

Thematic responses

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

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Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

PRO.03.01 Intakes

The Alto Maipo Hydroelectric Project (PHAM) plans to capture water resources at eight different points. The Project holds in-stream water rights at each of these points, and the concessions granting rights at most of these points include ecological flow rate stipulations issued by the Directorate General of Water (DGA).

The water intake points are as follows:

For the Alfalfal II Plant: the El Morado Stream, the La Engorda Stream, the Colina Stream, the Las Placas Creek, and the Yeso River. For the Las Lajas Plant: the Alfalfal Plant discharge, and the Colorado River at the Maitenes Intake. For a detailed description of planned installations, see Chapter 2, Section 2.2.2 of the EIS, and attached Annexes 1 and 8.

See Annex 12 of the EIS for a map of intakes in the PHAM area of influence. See Table 2.2.2, in Chapter 2 of the EIS, for the characteristics and descriptions of the intake installation.

For information on the Project's impact on water quality in the area's watercourses arising as a result of the construction of intakes, see Section I, Question 3 in the Addendum.

For the intake maintenance plan, the Chapter 2, Section 2.2.2 of the EIS, and additional information provided in Section I, Question 11 of the Addendum.

For clarifications regarding the El Yeso Reservoir, see Section I, question 27 in the Addendum.

For details on the construction methods and the mitigation and compensation measures planned by the Project to address the environmental impact of the intakes, see Annex 6 of the

Addendum.

PRO.03.02 Tunnels

The majority of the Project is planned for installation underground. The general characteristics of the tunnels are described in Chapter 2 of the EIS, Table 2.2.5 (for detailed geological information on the path taken by the tunnels, see Annex 46 of the EIS).

For an evaluation of the impact and environmental management measures associated with underground installations, see Chapter 6 of the EIS.

Annex 45 of the EIS, Hydro-Geology of Underground Works, presents a general description of the geological conditions that are expected to be found along the lengths of the tunnels; expected permeability based on geological knowledge and hydro-geological conditions in the area, incorporating experience gained during the construction of tunnels for the Alfalfa Plant, which has been operative for more than 17 years; as well as a description that includes the design of the tunnels, providing a brief explanation of the methods to be used to reduce and control water seepage.

With regard to the impact of the path taken by the tunnel passing underneath the El Morado Natural Monument, and measures to be taken to respect the area, see Section I, Responses 4, 5, and 6, in the Addendum.

Remark N° 70 Intakes - Visual Impact

The site where the intakes are to be installed in the tributaries of the Volcán River is widely visited in winter and in summer, with over 20 thousand Chileans and foreign nationals visiting each year to marvel at the area's scenic beauty.

In view of this situation, the visual impact of the channels and intakes that draw water into the tunnels should be established.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit

the more remote parts of the Project area, reducing

- emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **TUR Tourism Scenery**

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

TUR.03 Visual impact

The Project is to be located, taking into account esthetic and perceptual considerations and emphasizing the characterization and appraisal of the issues of visibility, quality, and visual fragility of the landscape.

In terms of Landscape Alteration or Landscape Impact associated with this infrastructure project, potential effects are classified as either limited duration - generally applying during the construction phase - or permanent, for effects that shall persist during the operations phase and continue throughout the working life of the Project. A qualitative methodology is used to study these effects, whereby the first phase consists of identifying sources of visual Impact, and the second phase relates to identifying and classifying environmental impacts.

As a general rule, it is assumed that impact on the landscape during the construction phase shall be temporary, mainly due to the transitory nature of the sources of impact, the low level of prior human activity in certain areas, and the relatively low level of physical and visual accessibility of a significant proportion of the area subject to intervention.

As most of the Project construction works will be situated underground, during the operations phase the main visual signatures of its existence will be the intakes and access roads.

For further information on the methodology used for landscape impact assessment, see **Chapter 6, Section 6.1.4.10 of the EIS, and Annex 17 of Addendum 1.**

Remark N° 71 Muck Disposal Heaps

The sites where rock material produced through tunnel excavation will be disposed of in heaps should be specified definitively. In view of existing laws protecting the areas, these sites should not be located in the Cajón del Maipo Valley.

Thematic responses

MAR Muck

The PHAM plans to construct approximately 70 km of tunnels. The excavation of these tunnels will generate inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of inert material produced in road building and the construction of buried conduits.

This muck material will be deposited in the 14 muck disposal heaps that the Project plans to create. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria. For more information, please see **Annex 6 of the EIS** and **Annex 3 of the Addendum**.

MAR.01 Regulations

The Project Owner has made available a Management Plan for "Project Muck Disposal Heaps", which contains information on the technical, environmental, and safety specifications of the heaps, as well as recommendations contained in the Ministry of Public Works' 2004 Environmental Management Plan Manual for Works Subject to Concessions. In particular, the Plan establishes the environmental considerations adopted for the operation of the muck disposal heaps, to be implemented during the construction of tunnels and roads under the PHAM.

In order to comply with the environmental management measures contained in the EIS, an Environmental Monitoring Program will be conducted, with the aim of verifying the effectiveness of these measures and compliance with them. For details on the principal actions included in the Monitoring Program, and for the various stages of functionality of the muck disposal sites, see **Annex 6 of the EIS** and **Annex 3 of Addendum 1**.

For more information on the specific regulations applicable to the Project, and compliance therewith, see **Chapter 3 of the EIS**.

MAR.02 Location

The PHAM calls for the creation of 14 muck disposal heaps, for the disposal of waste material from tunnel boring and smaller quantities of inert waste from the construction of roads and buried conduits. Maps of the muck disposal heaps, and a copy of the muck disposal heap management plan, are included in Annex 6 of the Project EIS.

For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria.

From a technical and safety perspective, the muck disposal heap sites have been located as close as possible to exit points from tunnels and to surface work sites, in areas not at risk to landslides or landslip events.

The following aspects have been taken into account as environmental criteria in site selection:

Sites have been selected that are distant from any settlements or any housing used on a permanent or temporary basis.

Priority has been given to selecting sites with low visual impact - that is, in areas that are distant from potential observation points on public highways or high ground.

In the Project area's higher elevation regions, the disposal heaps have been sited up against natural topological features, such that the emplacement of the heaps' layers forms a continuation of the general landform structures of the area.

In general these are areas that are of low value as a habitat for plant life (soils with usage capacity ratings V, VI, and VII), and efforts have been made to avoid modifications to the original land form structures present or to surface watercourses.

Surface surveys have been conducted in all of these regions, as details in **Section 5.8, in Chapter 5 of the EIS**, to rule out the presence of sites of archeological and/or paleontological value at the muck disposal heap sites.

For more information, see **Annex 6 of the EIS** and **Annex 3 of Addendum 1**.

MAR.03 Characteristics

The material to be deposited in the muck disposal heaps will be inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of waste material produced in road building and the construction of buried conduits. It is expected that a total of 1.7 m cubic meters of TBM muck will be produced.

The total volume of material to be disposed of is estimated at 2.7 m cubic meters, including uncompacted rock and soil; this material will be disposed of at the 14 muck disposal heap sites planned under the PHAM. Maps of the muck disposal heaps, and a copy of the muck disposal heap management plan, are included in Annex 6 of the EIS.

The waste material produced through tunnel excavation, road building, and construction of buried

conduits during the construction phase will be deposited in a series of layers forming terraces.
The muck disposal heaps will be built up in an organized manner, forming level and safe

platforms, with slopes at the sides with the natural gradient formed by the material in question, thus ensuring stability and permitting adequate drainage. All of these design features are in conformity with the muck disposal heap construction method and environmental measures indicated in **Section 4.2 of Annex 6 of the EIS, and Annex 3 of Addendum 1**.

Finally, the filling will be covered with 20 cm of organic soil, permitting the definitive finishing of the spoil heap.

Management and restoration techniques for the 14 muck disposal heaps are indicated in Annex 29, "Restoration Plan", which includes information on surface treatments.

MAR.04 Impact

All of the measures adopted for the creation, operation, and abandonment of the muck disposal heaps will be implemented by the Works Contractor. Gener will undertake an environmental monitoring plan addressing the management and usage of the sites, which will include site inspections and periodic review of site entry records.

Rainwater will be managed using specially designed channeling works, the details of each of which are indicated in the plans attached in Annex 6 of the EIS.

The Project Owner's reiterates its commitment to undertake an exhaustive program to rescue low mobility fauna in the area of direct influence of PHAM works (including the area to be occupied by the 14 sites where muck, spoil, and earth will be disposed of in heaps). This wildlife rescue will require the application of capture techniques suitable for small mammals, reptiles, and amphibians. **Annex 4 of Addendum 1** presents the Wildlife Rescue and Relocation Plan.

Even following surveys ruling out the presence of archeological or paleontological sites or finds in the muck disposal heap sites, the PHAM also includes a series of measures designed to prevent any intervention in sites with heritage value, with the implementation of restricted areas and training programs for contractor personnel. For more information, see **Annex 14 of Addendum 1 and Annex 33 of the EIS, "Restricted areas"**.

MAR.05 Composition and Hazardousness

Although the waste material produced from tunneling activities will be inert - in the construction of tunnels for the Alfalfa Plant, where 35 km of tunnels were excavated, no evidence was found of material that could lead to acidic or basic drainage in contact with rainwater - the PHAM includes a management plan applicable to water that may be produced from contact between muck or waste rock and rainwater or snow. For further details, see Annex 6 of the EIS.

The Project Owner plans to take measurements to assess the possibility of acidic drainage at the muck disposal heap sites, as indicated in **Annex 6, Section 5 in the EIS and Response 10 in Section 9 of Addendum 1**. The actions will form part of the Environmental Monitoring Plan, and will be preventive rather than response actions.

Remark N° 72 Muck disposal heaps - Details

The final disposal of the muck and waste rock produced should be clearly specified, providing detailed information on each of the planned heaps, featuring figures, graphics, and photographs showing where each heap will be sited and explaining its final visual impact.

Thematic responses

MAR Muck

The PHAM plans to construct approximately 70 km of tunnels. The excavation of these tunnels will generate inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of inert material produced in road building and the construction of buried conduits.

This muck material will be deposited in the 14 muck disposal heaps that the Project plans to create. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria. For more information, please see **Annex 6 of the EIS** and **Annex 3 of the Addendum**.

MAR.02 Location

The PHAM calls for the creation of 14 muck disposal heaps, for the disposal of waste material from tunnel boring and smaller quantities of inert waste from the construction of roads and buried conduits. Maps of the muck disposal heaps, and a copy of the muck disposal heap management plan, are included in Annex 6 of the Project EIS.

For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria.

From a technical and safety perspective, the muck disposal heap sites have been located as close as possible to exit points from tunnels and to surface work sites, in areas not at risk to landslides or landslip events.

The following aspects have been taken into account as environmental criteria in site selection:

Sites have been selected that are distant from any settlements or any housing used on a permanent or temporary basis.

Priority has been given to selecting sites with low visual impact - that is, in areas that are distant from potential observation points on public highways or high ground.

In the Project area's higher elevation regions, the disposal heaps have been sited up against natural topological features, such that the emplacement of the heaps' layers forms a continuation of the general landform structures of the area.

In general these are areas that are of low value as a habitat for plant life (soils with usage capacity ratings V, VI, and VII), and efforts have been made to avoid modifications to the original land form structures present or to surface watercourses.

Surface surveys have been conducted in all of these regions, as details in **Section 5.8, in Chapter 5 of the EIS**, to rule out the presence of sites of archeological and/or paleontological value at the muck disposal heap sites.

For more information, see **Annex 6 of the EIS** and **Annex 3 of Addendum 1**.

Remark N° 73 Muck disposal heaps - Capacity

The capacity of each muck disposal heap, and the source, composition, and quantity of material to be deposited in it, should be specified. The muck disposal heaps shown in the diagrams do not seem to be sufficient to receive the quantity of muck that will be generated, estimated at 1,400,000 m³.

Thematic responses

MAR Muck

The PHAM plans to construct approximately 70 km of tunnels. The excavation of these tunnels will generate inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of inert material produced in road building and the construction of buried conduits.

This muck material will be deposited in the 14 muck disposal heaps that the Project plans to create. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria. For more information, please see **Annex 6 of the EIS** and **Annex 3 of the Addendum**.

MAR.03 Characteristics

The material to be deposited in the muck disposal heaps will be inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of waste material produced in road building and the construction of buried conduits. It is expected that a total of 1.7 m cubic meters of TBM muck will be produced.

The total volume of material to be disposed of is estimated at 2.7 m cubic meters, including uncompacted rock and soil; this material will be disposed of at the 14 muck disposal heap sites planned under the PHAM. Maps of the muck disposal heaps, and a copy of the muck disposal heap management plan, are included in Annex 6 of the EIS.

The waste material produced through tunnel excavation, road building, and construction of buried conduits during the construction phase will be deposited in a series of layers forming terraces. The muck disposal heaps will be built up in an organized manner, forming level and safe platforms, with slopes at the sides with the natural gradient formed by the material in question, thus ensuring stability and permitting adequate drainage. All of these design features are in conformity with the muck disposal heap construction method and environmental measures indicated in **Section 4.2 of Annex 6 of the EIS, and Annex 3 of Addendum 1**.

Finally, the filling will be covered with 20 cm of organic soil, permitting the definitive finishing of the spoil heap.

Management and restoration techniques for the 14 muck disposal heaps are indicated in Annex 29, "Restoration Plan", which includes information on surface treatments.

MAR.05 Composition and Hazardousness

Although the waste material produced from tunneling activities will be inert - in the construction of tunnels for the Alfalfa Plant, where 35 km of tunnels were excavated, no evidence was found of material that could lead to acidic or basic drainage in contact with rainwater - the PHAM includes a management plan applicable to water that may be produced from contact between muck or waste rock and rainwater or snow. For further details, see Annex 6 of the EIS.

The Project Owner plans to take measurements to assess the possibility of acidic drainage at the muck disposal heap sites, as indicated in **Annex 6, Section 5 in the EIS** and **Response 10 in Section 9 of Addendum 1**. The actions will form part of the Environmental Monitoring Plan, and will be preventive rather than response actions.

Remark N° 74 Muck disposal heaps - Access

Additionally, if the muck disposal heaps are located in areas of scenic or tourism interest, access conditions during the construction period must be specifically stated.

The current situation - free access with no requirement to request authorizations, no barriers, and no guards requesting identification - should not be altered.

Thematic responses

MAR Muck

The PHAM plans to construct approximately 70 km of tunnels. The excavation of these tunnels will generate inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of inert material produced in road building and the construction of buried conduits.

This muck material will be deposited in the 14 muck disposal heaps that the Project plans to create. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria. For more information, please see **Annex 6 of the EIS** and **Annex 3 of the Addendum**.

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayes, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions.

The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS**.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

VIA.05 Free transit

The PHAM shall not interrupt access by mountain climbers, hikers, or permanent or sporadic

visitors who enter the area for leisure, sports, cultural activities, etc. For safety reasons, the PHAM will restrict access only to its installations and work sites. Similarly, there will be no restrictions on access to properties owned by third parties and used for livestock grazing; in other words, usage conditions in summer and winter grazing areas have always been subject to agreements between livestock herders and landowners, and this situation will not be modified by the Project.

Remark N° 75 Muck disposal heaps - Visual Impact

In Chapter 2, page 10, it is stated that the muck disposal heap sites constitute land that will be occupied on a permanent basis.

In order to prevent the generation of a major visual impact and heavy metal contamination that could leach into the environment from tunneling works, these sites should be restored once construction has been completed, and material deposited at an authorized site.

Thematic responses

MAR Muck

The PHAM plans to construct approximately 70 km of tunnels. The excavation of these tunnels will generate inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of inert material produced in road building and the construction of buried conduits.

This muck material will be deposited in the 14 muck disposal heaps that the Project plans to create. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria. For more information, please see **Annex 6 of the EIS** and **Annex 3 of the Addendum**.

MAR.01 Regulations

The Project Owner has made available a Management Plan for "Project Muck Disposal Heaps", which contains information on the technical, environmental, and safety specifications of the heaps, as well as recommendations contained in the Ministry of Public Works' 2004 Environmental Management Plan Manual for Works Subject to Concessions. In particular, the Plan establishes the environmental considerations adopted for the operation of the muck disposal heaps, to be implemented during the construction of tunnels and roads under the PHAM.

In order to comply with the environmental management measures contained in the EIS, an Environmental Monitoring Program will be conducted, with the aim of verifying the effectiveness of these measures and compliance with them. For details on the principal actions included in the Monitoring Program, and for the various stages of functionality of the muck disposal sites, see **Annex 6 of the EIS** and **Annex 3 of Addendum 1**.

For more information on the specific regulations applicable to the Project, and compliance therewith, see **Chapter 3 of the EIS**.

MAR.04 Impact

All of the measures adopted for the creation, operation, and abandonment of the muck disposal heaps will be implemented by the Works Contractor. Gener will undertake an environmental monitoring plan addressing the management and usage of the sites, which will include site inspections and periodic review of site entry records.

Rainwater will be managed using specially designed channeling works, the details of each of which are indicated in the plans attached in Annex 6 of the EIS.

The Project Owner's reiterates its commitment to undertake an exhaustive program to rescue low mobility fauna in the area of direct influence of PHAM works (including the area to be occupied by the 14 sites where muck, spoil, and earth will be disposed of in heaps). This wildlife rescue will require the application of capture techniques suitable for small mammals, reptiles, and amphibians. **Annex 4 of Addendum 1** presents the Wildlife Rescue and Relocation Plan.

Even following surveys ruling out the presence of archeological or paleontological sites or finds in the muck disposal heap sites, the PHAM also includes a series of measures designed to prevent any intervention in sites with heritage value, with the implementation of restricted areas and training programs for contractor personnel. For more information, see **Annex 14 of Addendum 1 and Annex 33 of the EIS**, "Restricted areas".

MAR.05 Composition and Hazardousness

Although the waste material produced from tunneling activities will be inert - in the construction of tunnels for the Alfalfa Plant, where 35 km of tunnels were excavated, no evidence was found of material that could lead to acidic or basic drainage in contact with rainwater - the PHAM includes a management plan applicable to water that may be produced from contact between muck or waste rock and rainwater or snow. For further details, see Annex 6 of the EIS.

The Project Owner plans to take measurements to assess the possibility of acidic drainage at the muck disposal heap sites, as indicated in **Annex 6, Section 5 in the EIS** and **Response 10 in Section 9 of Addendum 1**. The actions will form part of the Environmental Monitoring Plan, and will be preventive rather than response actions.

Remark N° 76 Muck disposal heap - water pollution

The Environmental Impact Study should consider the risk that, during the springtime snow melt, runoff water may be contaminated with the minerals that may be present in the waste material deposited in the heaps. To date, no empirical knowledge exists regarding what minerals may be present.

Thematic responses

MAR Muck

The PHAM plans to construct approximately 70 km of tunnels. The excavation of these tunnels will generate inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of inert material produced in road building and the construction of buried conduits.

This muck material will be deposited in the 14 muck disposal heaps that the Project plans to create. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria. For more information, please see **Annex 6 of the EIS** and **Annex 3 of the Addendum**.

MAR.04 Impact

All of the measures adopted for the creation, operation, and abandonment of the muck disposal heaps will be implemented by the Works Contractor. Gener will undertake an environmental monitoring plan addressing the management and usage of the sites, which will include site inspections and periodic review of site entry records.

Rainwater will be managed using specially designed channeling works, the details of each of which are indicated in the plans attached in Annex 6 of the EIS.

The Project Owner's reiterates its commitment to undertake an exhaustive program to rescue low mobility fauna in the area of direct influence of PHAM works (including the area to be occupied by the 14 sites where muck, spoil, and earth will be disposed of in heaps). This wildlife rescue will require the application of capture techniques suitable for small mammals, reptiles, and amphibians. **Annex 4 of Addendum 1** presents the Wildlife Rescue and Relocation Plan.

Even following surveys ruling out the presence of archeological or paleontological sites or finds in the muck disposal heap sites, the PHAM also includes a series of measures designed to prevent any intervention in sites with heritage value, with the implementation of restricted areas and training programs for contractor personnel. For more information, see **Annex 14 of Addendum 1 and Annex 33 of the EIS**, "Restricted areas".

MAR.05 Composition and Hazardousness

Although the waste material produced from tunneling activities will be inert - in the construction of tunnels for the Alfalfa Plant, where 35 km of tunnels were excavated, no evidence was found of material that could lead to acidic or basic drainage in contact with rainwater - the PHAM includes a management plan applicable to water that may be produced from contact between muck or waste rock and rainwater or snow. For further details, see Annex 6 of the EIS.

The Project Owner plans to take measurements to assess the possibility of acidic drainage at the muck disposal heap sites, as indicated in **Annex 6, Section 5 in the EIS** and **Response 10 in Section 9 of Addendum 1**. The actions will form part of the Environmental Monitoring Plan, and will be preventive rather than response actions.

Remark N° 77 El Volcán - Visual Impact

In Chapter 2, page 39, it is stated that:

"Priority has been given to selecting sites with low visual impact - that is, in areas that are distant from potential observation points on public highways or high ground."

Figure 2.2.1.2 indicates that the muck disposal heap pertaining to the El Volcán will be located well within the Valle de las Arenas, in a site that is fully visible from the road to Baños Colina and from the hiking trail to Volcán San José and the Mesoncito Valley - all located at high elevations. A public track also passes through the area.

Thematic responses

MAR Muck

The PHAM plans to construct approximately 70 km of tunnels. The excavation of these tunnels will generate inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of inert material produced in road building and the construction of buried conduits.

This muck material will be deposited in the 14 muck disposal heaps that the Project plans to create. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria. For more information, please see **Annex 6 of the EIS** and **Annex 3 of the Addendum**.

MAR.02 Location

The PHAM calls for the creation of 14 muck disposal heaps, for the disposal of waste material from tunnel boring and smaller quantities of inert waste from the construction of roads and buried conduits. Maps of the muck disposal heaps, and a copy of the muck disposal heap management plan, are included in Annex 6 of the Project EIS.

For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria.

From a technical and safety perspective, the muck disposal heap sites have been located as close as possible to exit points from tunnels and to surface work sites, in areas not at risk to landslides or landslip events.

The following aspects have been taken into account as environmental criteria in site selection:

Sites have been selected that are distant from any settlements or any housing used on a permanent or temporary basis.

Priority has been given to selecting sites with low visual impact - that is, in areas that are distant from potential observation points on public highways or high ground.

In the Project area's higher elevation regions, the disposal heaps have been sited up against natural topological features, such that the emplacement of the heaps' layers forms a continuation of the general landform structures of the area.

In general these are areas that are of low value as a habitat for plant life (soils with usage capacity ratings V, VI, and VII), and efforts have been made to avoid modifications to the original land form structures present or to surface watercourses.

Surface surveys have been conducted in all of these regions, as details in **Section 5.8, in Chapter 5 of the EIS**, to rule out the presence of sites of archeological and/or paleontological value at the muck disposal heap sites.

For more information, see **Annex 6 of the EIS** and **Annex 3 of Addendum 1**.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

TUR Tourism

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in

a modification in level of

natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.03 Visual impact

The Project is to be located, taking into account esthetic and perceptual considerations and emphasizing the characterization and appraisal of the issues of visibility, quality, and visual fragility of the landscape.

In terms of Landscape Alteration or Landscape Impact associated with this infrastructure project, potential effects are classified as either limited duration - generally applying during the construction phase - or permanent, for effects that shall persist during the operations phase and continue throughout the working life of the Project. A qualitative methodology is used to study these effects, whereby the first phase consists of identifying sources of visual impact, and the second phase relates to identifying and classifying environmental impacts.

As a general rule, it is assumed that impact on the landscape during the construction phase shall be temporary, mainly due to the transitory nature of the sources of impact, the low level of prior human activity in certain areas, and the relatively low level of physical and visual accessibility of a significant proportion of the area subject to intervention.

As most of the Project construction works will be situated underground, during the operations phase the main visual signatures of its existence will be the intakes and access roads.

For further information on the methodology used for landscape impact assessment, see **Chapter 6, Section 6.1.4.10 of the EIS, and Annex 17 of Addendum 1**.

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**.

The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.05 Free transit

The PHAM shall not interrupt access by mountain climbers, hikers, or permanent or sporadic visitors who enter the area for leisure, sports, cultural activities, etc. For safety reasons, the PHAM will restrict access only to its installations and work sites.

Similarly, there will be no restrictions on access to properties owned by third parties and used for livestock grazing; in other words, usage conditions in summer and winter grazing areas have always been subject to agreements between livestock herders and landowners, and this situation will not be modified by the Project.

Remark N° 78 Tunnels - Visual Impact

The visual impact caused by the work sites for the different tunnels to be built should be clearly specified.

Thematic responses

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

PRO.03.02 Tunnels

The majority of the Project is planned for installation underground. The general characteristics of the tunnels are described in Chapter 2 of the EIS, Table 2.2.5 (for detailed geological information on the path taken by the tunnels, see Annex 46 of the EIS).

For an evaluation of the impact and environmental management measures associated with underground installations, see Chapter 6 of the EIS.

Annex 45 of the EIS, Hydro-Geology of Underground Works, presents a general description of the geological conditions that are expected to be found along the lengths of the tunnels; expected permeability based on geological knowledge and hydro-geological conditions in the area, incorporating experience gained during the construction of tunnels for the Alfalfal Plant, which has been operative for more than 17 years; as well as a description that includes the design of the tunnels, providing a brief explanation of the methods to be used to reduce and control water seepage.

With regard to the impact of the path taken by the tunnel passing underneath the El Morado Natural Monument, and measures to be taken to respect the area, see Section I, Responses 4, 5, and 6, in the Addendum.

PRO.03.03 Encampments and Works Installations

For details on the creation of encampments and works installations, please see Chapter 2, Section 2.3.2.4 in the EIS.

For information on PHAM encampment and work site approach routes, see EIS, Chapter 2, Table 2.1.2,

For information on regulations, see Chapter 3 of the EIS and Annex 33, General Operating Regulations for Encampments and Work Sites.

For information on the management of waste produced at work sites and encampments, see Annex 18 of the EIS, "Site Installation Waste Management Plan".

For information on the discharge of treated wastewater, see Response 26 in the Addendum.

For information on human consumption of water at encampments and works installations, see Chapter 2, Section 2.3.2.4, parts b and i.

For an assessments of the impact of the creation of encampments and works installations, monitoring methods,

and conditions, see Chapter 6 of the EIS.

TUR Tourism

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.03 Visual impact

The Project is to be located, taking into account esthetic and perceptual considerations and emphasizing the characterization and appraisal of the issues of visibility, quality, and visual fragility of the landscape.

In terms of Landscape Alteration or Landscape Impact associated with this infrastructure project, potential effects are classified as either limited duration - generally applying during the construction phase - or permanent, for effects that shall persist during the operations phase and continue throughout the working life of the Project. A qualitative methodology is used to study these effects, whereby the first phase consists of identifying sources of visual impact, and the second phase relates to identifying and classifying environmental impacts.

As a general rule, it is assumed that impact on the landscape during the construction phase shall be temporary, mainly due to the transitory nature of the sources of impact, the low level of prior human activity in certain areas, and the relatively low level of physical and visual accessibility of a significant proportion of the area subject to intervention.

As most of the Project construction works will be situated underground, during the operations phase the main visual signatures of its existence will be the intakes and access roads.

For further information on the methodology used for landscape impact assessment, see **Chapter 6, Section 6.1.4.10 of the EIS, and Annex 17 of Addendum 1**.

Remark N° 79 Human Environment

In Chapter 5, point 5.5.2.5, on Basic Social Welfare Aspects, Page 48 D, it is stated that:

"All settlements in the Project's area of influence possess access to the natural environment. Indeed, a significant proportion of them are located in areas that feature almost untouched surroundings, and local residents therefore have extensive access to natural areas.

Key components of the area's natural environment include its watercourses and their valleys, as well as its mountain ranges. Similarly, although the area's highway infrastructure does not show high levels of development and is strongly affected by prevailing weather conditions, existing routes permit access to areas where the natural environment may be enjoyed. Nonetheless, hiking trails are of significant importance in the area, given that, together with their associated tourism infrastructure, they provide rapid and well-informed access to the local area's natural sites".

Attention should be drawn to the fact that their status as untouched areas draws in many Chilean and foreign tourists who come in search of country areas for relaxation and leisure; these areas are normally visited by people who are tired of being surrounded by tourism installations, as so often occurs in Europe, for example, where many tourist sites feature the presence of large, modern installations. For instance, it is normal to see groups of tourists camping out beside the Laguna del Morado Lake, and ice-climbing in the glacier above it; this is also a starting point for hiking trips and attempts on a number of nearby mountaintops.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;

- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **TUR Tourism**

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

TUR.03 Visual impact

The Project is to be located, taking into account esthetic and perceptual considerations and emphasizing the characterization and appraisal of the issues of visibility, quality, and visual fragility of the landscape.

In terms of Landscape Alteration or Landscape Impact associated with this infrastructure project, potential effects are classified as either limited duration - generally applying during the construction phase - or permanent, for effects that shall persist during the operations phase and continue throughout the working life of the Project. A qualitative methodology is used to study these effects, whereby the first phase consists of identifying sources of visual impact, and the second phase relates to identifying and classifying environmental impacts.

As a general rule, it is assumed that impact on the landscape during the construction phase shall be temporary, mainly due to the transitory nature of the sources of impact, the low level of prior human activity in certain areas, and the relatively low level of physical and visual accessibility of a significant proportion of the area subject to intervention.

As most of the Project construction works will be situated underground, during the operations phase the main visual signatures of its existence will be the intakes and access

roads. For further information on the methodology used for landscape impact assessment,

see **Chapter 6, Section 6.1.4.10 of the EIS, and Annex 17 of Addendum 1.**

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1.** The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS.**

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayas, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions. The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS.**

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

VIA.05 Free transit

The PHAM shall not interrupt access by mountain climbers, hikers, or permanent or sporadic visitors who enter the area for leisure, sports, cultural activities, etc. For safety reasons, the PHAM will restrict access only to its installations and work sites. Similarly, there will be no restrictions on access to properties owned by third parties and used for livestock grazing; in other words, usage conditions in summer and winter grazing areas have always been subject to agreements between livestock herders and landowners, and this situation will not be modified by the Project.

Remark N° 80 Tourism and Access Routes

It should be specified that both AES Gener and its contractors shall not be authorized to prohibit access for the purpose of visiting any area located close to the Projects work sites and installations, whether the visitor seeks to engage in scientific, cultural, or educational activities, leisure, sports, tourism, onward travel to another point, farming, livestock herding, or any other purpose, applying to Chileans citizens and foreigners.

Equally, there should be no barriers or guards who request identification or any other document or authorization for such access.

AES Gener should also take responsibility for the safety of those who directly enter its installations.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative,

that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **TUR Tourism Scenery**

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayes, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions. The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures,

see

Chapter 2, point 2.3.2.5 of the EIS.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

VIA.05 Free transit

The PHAM shall not interrupt access by mountain climbers, hikers, or permanent or sporadic visitors who enter the area for leisure, sports, cultural activities, etc. For safety reasons, the PHAM will restrict access only to its installations and work sites. Similarly, there will be no restrictions on access to properties owned by third parties and used for livestock grazing; in other words, usage conditions in summer and winter grazing areas have always been subject to agreements between livestock herders and landowners, and this situation will not be modified by the Project.

Remark N° 81

Human Environment - Activities around the Volcán River

In Chapter 5, page 5.5, on the HUMAN ENVIRONMENT: On page 5 of the baseline study, it is indicated that: *"Volcán River Valley: The settlements of El Romeral, El Volcán, Baños Morales, and Lo Valdés are located in this valley. These settlements depend on mining activity. Tourism has shown gradual growth as an economic activity in the district, principally in the settlements of Baños Morales and Lo Valdés. This is an area that attracts persons from different socio-economic groups, and those with special interests, including lower-middle socio-economic groups in the Metropolitan Region - who visit the popular Baños de Colina and the thermal springs at Baños Morales - as well as special interest groups such as Chilean and foreign mountain climbers frequenting Lo Valdés and the El Morado Sanctuary."*

The EIS does not mention that the areas that are most frequently visited by mountain climbers and by Chilean and foreign hikers also include the Valle de las Arenas, Mesoncito, El Morado, the Valle de la Engorda en route to the San José Volcano, and the Valle del Marmolejo en route to the Marmolejo Peak (see information on foreign visitors held by Difrol). Similarly, it does not indicate that the areas that are most accessible and that show growing tourism activity are the following sites:

The area known as "Choriboulder" located in the Valle de las Arenas (at which site plans call for the installation of an encampment and a muck disposal heap). This area is one of the country's most significant climbing sites for bouldering, and a starting point for visitors en route to other areas such as the Valle del Mesoncito, Laguna del Morado, the peaks known as Unión, Punta Italia, Punta Chile, Yamakawa, Mesón Alto for its south-east wall, Loma Larga, and many others. Evening gatherings of the climbing and mountaineering community are also held periodically at this site. The Laguna del Morado Lake, also known as "San Rafael de los Pobres" due to its scenic beauty that is reminiscent of the San Rafael Glacier but that can be visited more cheaply and easily from Santiago. This lake is fed by meltwater from the imposing El Morado Glacier, and it is a much-frequented site by not only Chileans but also foreigners, due to its spectacular vistas and easy, free access. This site is used by a number of institutions - including the National Mountain School, university mountaineering courses, and several mountain sports clubs - to give ice climbing and glacier mountaineering courses. This lake is not to be confused with the smaller Morales Lake, located inside the El Morado Natural Monument.

Cerro Marmolejo, a mountain with its summit at 6110 masl, accessed along the Marmolejo Valley. This is a particularly significant site in world tourism, being the planet's most southerly mountain of over six thousand meters - a feature that leads to global renown. It is also a vital site for Chilean mountaineering, as it is the most accessible peak of over six thousand meters in Central Chile, that can be climbed without bureaucratic obstacles.

The area features a number of less-visited mountain sites that are nonetheless of equal importance for tourism, such as the aforementioned Valle del Mesoncito, the peaks of Rubilla, Unión, Morado, Mesón Alto, Arenas, Punta Italia, Punta Chile, Moai, Yamakawa, Loma Larga, and the San José Volcano, among others.

These areas have potential not only in terms of tourism, but also for education: they are currently often used for mountaineering courses, training in camping techniques, winter survival, and ice climbing, rock climbing, and mixed climbing, leveraging their rapid and easy access. A range of educational institutions also use the area for field trips in courses on subjects such as ecotourism and geology.

These areas are visited not only during the summer season but also in the winter, when their beauty is all the more imposing and when they are similarly a key site for mountaineering training. Many of those who visit the Cajón del Maipo come in search of these untouched areas, helping support the tourism sector and contributing to the local economy.

If the implementation of this Project is implemented, AES Gener must offer a binding agreement that access to these areas (and to other areas not mentioned above) must continue to be free and open, with no requirement for permits or similar, and with no barriers or guards who request identification.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plant (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the

PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **TUR Tourism**

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected

to have no impact on tourism activities (see **Chapter 6.4 of the EIS**).
Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:
Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.05 Free transit

The PHAM shall not interrupt access by mountain climbers, hikers, or permanent or sporadic visitors who enter the area for leisure, sports, cultural activities, etc. For safety reasons, the PHAM will restrict access only to its installations and work sites. Similarly, there will be no restrictions on access to properties owned by third parties and used for livestock grazing; in other words, usage conditions in summer and winter grazing areas have always been subject to agreements between livestock herders and landowners, and this situation will not be modified by the Project.

Remark N° 82

Tourism

In Chapter 6, page 6, it is stated that:

"In general, the area shows growth in tourism development, leveraging its scenic qualities and natural attractions; this is in contrast to the presence of little tourism equipment and infrastructure, or associated services."

The Environmental Impact Study should take into account that this scarcity of tourism equipment and infrastructure is exactly the reason why many visitors choose to come to the area: this is its key strength, and the reason why many Chilean and foreign tourists select this area, because it is not marred by any type of infrastructure.

A few examples: <http://www.difrol.cl/CUMBRES%20VISITADAS%20A%C3%91O%202005.htm>

(See information on the Marmolejo and Tupungato peaks)

<http://www.escalando.cl/arenas.htm>

http://www.andesmountain.cl/santiagotrekking/fulldav_esp.html

<http://www2.inq.puc.cl/~cseebach/mountain/index.en.html>

<http://www.chile-travel.com/chile-climbing.html>

<http://www.amazon.com/Lonelv-Planet-Trekking-Central-Andes/dp/1740594312>

http://www.andesmountain.cl/chilemontana/marmolejo_sanjose_inq.html

<http://www2.inq.puc.cl/~cseebach/mountain/central/tupungato/index.html>

<http://www2.inq.puc.cl/~cseebach/mountain/central/maipo/index.html>

[http://links.jstor.org/sici?sici=0016-7398\(194605%2F06\)107%3A5%2F6%3C225%](http://links.jstor.org/sici?sici=0016-7398(194605%2F06)107%3A5%2F6%3C225%3ATCEITC%3E2.0.CO%3B2-Q)

[3ATCEITC%3E2.0.CO%3B2-Q](http://links.jstor.org/sici?sici=0016-7398(194605%2F06)107%3A5%2F6%3C225%3ATCEITC%3E2.0.CO%3B2-Q)

<http://www.turistel.cl/v2/secciones/actividades/escalada/escalada.htm>

<http://macomontaquax.wordpress.com/2007/02/19/expedicion-al-cerro-Marmoleio-6108-msnm/>

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

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Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

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The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing

- emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **TUR Tourism**

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 83

Tourism

In Chapter 5, point 5.6.2.4, part B: It is indicated that:

"With regard to basic infrastructure, there is a paved road to El Alfalfal, which is in a good condition; the high mountain areas of the region are accessible only along a private road owned by GENER S.A. Tourism signage and road signage is not adequate, with signs in a poor state of repair and some areas lacking signage altogether; public transport into the region is lacking".

It should be made clear that the lack of tourism activity and infrastructure described above can be attributed to the difficulties placed on access to the area's mountainous regions; this access depends precisely on the owner of the road leading to the high mountains, AES Gener.

This situation should be mentioned in the study as background information, relating to the attitude that the Company may adopt in other areas.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

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The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social

Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayes, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions. The Project's has been designed and engineered to include a suite of measures for the optimization

of the construction of new roads; for further information on these measures, see

Chapter 2, point 2.3.2.5 of the EIS.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

Remark N° 84 Tourism - Activities

In Chapter 5, section 5.6.2.4 part D. El Volcán - Baños Morales area, Page 68, the following points are specified regarding tourist activities in the area:

(1) Hiking and trekking, (2) Medium and high mountain climbing, (3) Rock climbing, (4) Horse riding, (5) Picnicking, (6) Rock hunting and archeological research, (7) Wildlife watching and appreciation of plant life (8) Use of thermal springs, and (9) Cycling.

Using this numbering system, it should also be indicated that all of these activities are also conducted in the following areas:

Valle de las Arenas: activities (1), (2), (3), (4), (6) and (7) and (9). This area receives visitors in both winter and summer seasons, and is a very important site for tourism in the area - at least as much so as the Valle de Lo Valdés, which is mentioned.

Valle del Mesoncito: activities (1), (2) and (3).

Valle del Morado (as far as Laguna del Morado and beyond): activities (1), (2), (3) and (4). A major site for these activities.

Valle de la Engorda and Valle del Marmolejo: principally activities (1),

(2) and (3). Valle de Colina.(1), (2), (3) and (8)

All of these areas attract Chilean and foreign visitors, even during the winter season, and it should also be made clear that the Valle del Marmolejo is a particularly significant site in world tourism, being the planet's most southerly mountain of over six thousand meters - a feature that leads to global renown.

AES Gener's EIS should be more rigorous in mentioning activities conducted in areas located close to planned site installations. For its part, the company should offer a binding agreement to preserve and respect current access conditions - free, open access with no need to request authorizations or to present documents, without barriers or guards requesting that visitors show their identification.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects

associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **TUR Tourism Scenery**

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.05 Free transit

Remarks and Responses

Remark N° 84 Page 3

The PHAM shall not interrupt access by mountain climbers, hikers, or permanent or sporadic visitors who enter the area for leisure, sports, cultural activities, etc. For safety reasons, the PHAM will restrict access only to its installations and work sites. Similarly, there will be no restrictions on access to properties owned by third parties and used for livestock grazing; in other words, usage conditions in summer and winter grazing areas have always been subject to agreements between livestock herders and landowners, and this situation will not be modified by the Project.

Remark N° 85

Legal - Tourism

In Chapter 6, page 3, it is stated that:

"6.3.2 Identification of Components Vulnerable to Impact

It should be pointed out that the area where the PHAM is to be installed features the following unique features, which have been granted particular emphasis in the evaluation conducted:

- Presence of officially protected areas.
- Presence of tourist activities at nearby sites.
- Presence of natural environments of conservation interest.
- Presence of areas of archeological interest at nearby sites."

The Environmental Impact Study should be expanded to include:

Presence of tourism and scientific activities in the areas planned for works installations and project usage.

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

ARQ.03 Scientific research

The scientific and cultural importance of the paleontological resources present has been recognized by the PHAM project principal, leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the project principal has taken on a commitment to enhance knowledge of the area before starting planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may be detected during the course of construction under the PHAM. These activities will contribute not only to the maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of materials or components present.

For more information, see **Annex 14 of Addendum 1**.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

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The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict

management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased. The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
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From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **PRO.02 EIS Additional and Complementary Information**

In accordance with consultation procedures conducted by oversight services, further studies and information have been incorporated into Addendum 1, which complements existing information provided in the EIS. Regarding ecological flow rates (**Annex 17**), cultural heritage (**Annex 14**) and the management of summer grazing areas (**Annex 6**).

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

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Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 86

Access Restrictions - Tourism

The final two paragraphs of point 5.6.3, in Chapter 5, titled Conclusions, state that:

"..., first of all, the Colorado River Basin area features development of observation and hiking tourism, conducted in the middle and lower Colorado River Valley, limited by the lack of any tourism infrastructure in the area; access to the upper stretches of the watercourse is controlled by private interests, meaning that a typical tourist is unable to access sites located along the Upper Colorado River."

It should be made clear that these controlling "private interests" are the company AES Gener itself - this is useful background information, relating to the attitude that the Company may adopt in other areas.

"... In the third area, on the Yeso River, there is a noteworthy absolute lack of tourism infrastructure, resulting in a significant proportion of the area's tourism being informal and spontaneous; similarly, the area has no settlement that would serve as a "center" for the development of tourist activities, and yet the area is also

strongly limited by climate conditions, which at times lead to the closure of Route G-455."

It should be made clear in the EIS that one of the reasons for the nearly complete absence of tourism in the area is the fact that it is controlled by private interests - in this case, Aguas Andinas. This may set precedents regarding the control exercised by companies in the areas where they hold land, and the possible resulting danger to tourism in the area. This also causes a danger to health, as people find themselves with ever more limited opportunities to engage in physical or leisure activities in an untouched environment.

In the areas involved in the Project, assuming that it goes ahead, AES Gener should offer a binding agreement to preserve and respect current access conditions - free, open access with no need to request authorizations or to present documents, without barriers or guards requesting that visitors show their identification.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and

- access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **TUR Tourism**

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The

layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS.**

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayas, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions. The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS.**

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

VIA.05 Free transit

The PHAM shall not interrupt access by mountain climbers, hikers, or permanent or sporadic visitors who enter the area for leisure, sports, cultural activities, etc. For safety reasons, the PHAM will restrict access only to its installations and work sites. Similarly, there will be no restrictions on access to properties owned by third parties and used for livestock grazing; in other words, usage conditions in summer and winter grazing areas have always been subject to agreements between livestock herders and landowners, and this situation will not be modified by the Project.

Remark N° 87

Scenic Value - Tourism

In Chapter 5, page 7, table 5.9.3.2, Visual quality and fragility, High River Landscape Unit Volcán, it is stated that:

With regard to Traditional Value, it should be indicated that, as well as the points mentioned, this is an area that is widely visited by Chileans and foreigners, courses in mountaineering, rock climbing, ice climbing, mixed climbing, and camping techniques; that is, the seasonal grazing activities mentioned in the EIS are not the only uses to which the area is put, as shown in the following web links (the product of a simple Google search) that demonstrate the truth behind this assertion:

http://www.andesmountain.cl/santiagotrekking/trekking_morado.html
<http://www.caucen.com/foros/viewtopic.php?pid=468>
http://www.escalando.cl/morado_kalkwand.htm (where some project works are to be sited)
<http://www.montaña.uchile.cl/foros/viewtopic.php?t=852>
<http://www.loscorrecaminos.cl/cabalqatas.htm>
http://www.elbruio.cl/estero_morado.htm
<http://www.elbruio.cl/union.htm>
<http://www.refuqiolovaldes.com/actividades.html#office>
<http://www.refuqiolovaldes.com/actividades.html#fandinism>
<http://www.refuqiolovaldes.com/actividades.html#trekking>

Would such a range of tourism services be available if there were merely a grazing area?

Furthermore, with regard to physical accessibility, the Environmental Impact Study should establish that the area in question is one of the few sectors of the high Andes that can still be freely accessed by anyone who wishes to visit it; additionally, as a result of its physical isolation it retains a high level of conservation, without any past need to restrict access to it with any kind of barrier or to require any paperwork for entry permits.

Thematic responses

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

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See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions.

The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS**.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

Remarks and Responses

Remark N° 87 Page 2

The PHAM shall not interrupt access by mountain climbers, hikers, or permanent or sporadic visitors who enter the area for leisure, sports, cultural activities, etc. For safety reasons, the PHAM will restrict access only to its installations and work sites. Similarly, there will be no restrictions on access to properties owned by third parties and used for livestock grazing; in other words, usage conditions in summer and winter grazing areas have always been subject to agreements between livestock herders and landowners, and this situation will not be modified by the Project.

Remark N° 88

Social Impact - Mitigation

AES Gener's proposal for the promotion of tourism in the area consists of a leaflet and a website, which would be added to the many such materials already in existence for the area. This proposal shows the company's indifference and lack of concern for a fragile community that is by no means wealthy, while complying with the letter of the law defining "social benefit".

Considering the Project's real impact and the investment that it will imply (600 million dollars), this planned investment in publicity is clearly insufficient to provide grounding for the Project presented in terms of social benefit.

AES Gener should offer real, long term, sustainable improvements for the different communities in the area, such as:

- * Construction of sports areas, and their maintenance in the long term (throughout the operating life of the Project).
 - * Usage of muck disposal heap sites to create new recreation areas.
 - * Construction of installations to contribute to local tourism in the area.
 - * Wide-ranging training to support personal business ventures.
- * Supply of information to communities in advance of the fact and in a timely manner regarding potential changes in ways of life.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **TUR Tourism**

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 89

Scenic Value and other issues

In Chapter 4, point 4.3.5, pages 21 and 22. In view of the statements made on these pages, and that on page 22

"IT IS CONCLUDED THAT THE PROJECT SHALL NOT GENERATE SIGNIFICANT ALTERATION TO THE LANDSCAPE VALUE OF THE AREA WHERE IT IS TO BE INSTALLED".

AES Gener should accept a binding commitment that the Project will permit the implementation of scientific, cultural, and educational activities, as well as leisure, sports, tourism, free passage, farming, livestock herding, and other actions, both by Chileans and by foreigners, as have traditionally been conducted before the Project's entry into the SEIA. The company should adopt an absolute commitment regarding protection of the area's cultural and scenic richness, and quality of life.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

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Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

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The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

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- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative,

that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

CAL.02 Education

A goal of the Maitenes Foundation relates to education for children and young people against the backdrop of the natural environment (for more information on the goals and achievements of the Foundation, see Annex 26 of the EIS).

Gener firmly believes that contributions to the technical and vocational education and training of young people must keep sight of real employment possibilities. Therefore, as a first initiative it has earmarked resources for an education improvement project in the district, which will contribute to establishing education management for the restructuring of the school curriculum and professional technical capacity building, taking into account the features needed to boost local employability. Based on information and recommendations from this study, Gener, acting through the Maitenes Foundation, will undertake a Capacity Building for Employability Program fundamentally oriented towards those whose family, social, or economic situation has barred them from completing their education and training, or acquiring the skills needed in order to find work.

CAL.03 Sports and leisure areas

In order to avoid the loss or modification of land usage patterns, changes in usage, or loss of income associated with potential reduction in perceptions of the value of the surrounding areas, in terms of the provision of leisure, tourism, education, and other related services, the Project has developed a suite of measures that aim to minimize its environmental impact, so as to preserve the features that lead to the high perception of value of the area among residents, visitors, and tourists. These measures include: installation of most works in underground settings, thus minimizing their visual impact; the preservation of ecological flow rates in rivers and streams; and revegetation and reforestation of affected areas.

Similarly, the Project has enacted a suite of further measures to minimize interference with traditional livestock industries, as well as tourism and mountain/river sports.

In this way, the Project has taken all steps necessary in order to mitigate impacts on the environment, which will allow the area to retain the characteristics that make it so attractive for open-air education, tourism, and leisure activities. This will allow the project to operate alongside existing activities conducted in this area.

A wide-ranging suite of monitoring activities will be implemented to verify the effectiveness of the environmental measures (for more information, see **Chapter 8 of the EIS**). In parallel, and in order to verify that the Project does not affect cultural land usage patterns, applicable indices will be included for monitoring under the Social Indicator Monitoring (SIM) program.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**.

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.03 Visual impact

The Project is to be located, taking into account esthetic and perceptual considerations and emphasizing the characterization and appraisal of the issues of visibility, quality, and visual fragility of the landscape.

In terms of Landscape Alteration or Landscape Impact associated with this infrastructure project, potential effects are classified as either limited duration - generally applying during the construction phase - or permanent, for effects that shall persist during the operations phase and continue throughout the working life of the Project. A qualitative and qualitative methodology is used to study these effects, whereby the first phase consists of identifying sources of visual impact, and the second phase relates to identifying and classifying environmental impacts. As a general rule, it is assumed that impact on the landscape during the construction phase shall be temporary, mainly due to the transitory nature of the sources of impact, the low level of prior human activity in certain areas, and the relatively low level of physical and visual accessibility of a significant proportion of the area subject to intervention. As most of the Project construction works will be situated underground, during the operations phase the main visual signatures of its existence will be the intakes and access roads. For further information on the methodology used for landscape impact assessment, see **Chapter 6, Section 6.1.4.10 of the EIS, and Annex 17 of Addendum 1.**

Remark N° 90 EIS Basis

It is vital that the EIS must be based on real plans for the Project, not on a basis, regulations, and layouts that could be developed and change in many different ways. In the final, defined physical project, this background information would certainly related to a materially different EIS. The environmental impact study of AES Gener should clearly express the details of the project itself, not general considerations.

Thematic responses

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.02 EIS Additional and Complementary Information

In accordance with consultation procedures conducted by oversight services, further studies and information have been incorporated into Addendum 1, which complements existing information provided in the EIS. Regarding ecological flow rates (**Annex 17**), cultural heritage (**Annex 14**) and the management of summer grazing areas (**Annex 6**).

Remark N° 91 Construction Waste

In Chapter 4, point 4.3.1, page 4, construction waste.

It is indicated that these materials will be stored on a temporary basis in specially prepared sites, awaiting reuse or sale. However, the plan does not establish the length of the maximum waiting period or what will happen if this time period is exceeded, if items fail to be reused or sold. They could remain in the Andean valleys forever, affecting the health of persons and the environment, with knock on effects on tourism in areas where this occurs.

The Project Owner should agree to remove these materials within a time period no longer than six months from the end of the construction phase.

It should be made explicitly clear that AES Gener shall be directly responsible for the suitable removal of waste generated at the Project's encampments and site installations, even when these activities are conducted by contractors.

The Project Owner should specify what will be the fate of the encampments and site installations once the construction of the Project's tunnels and conduits has been completed.

AES Gener should agree to leave the surroundings as it found them before starting the EIS.

Thematic responses

RES Waste

The Project Owner indicates that most waste generated will be produced during the Project's construction phase. Two types of waste will be produced:

- **Solid waste:**
Construction waste such as wood, piping offcuts, rubble, wires, waste packaging, metals, etc.
Domestic waste or waste similar to domestic waste; plant waste such as remains of shrubs, weeds, and smaller quantities of tree waste removed from work sites.
- **Liquid waste:**
Applicable to the following activities: concrete production, washing and preparation of aggregates, and washing of truck chassis and load beds, machinery, and tools. Other liquid waste relates to wastewater from bathrooms, showers, canteens, and other activities conducted within encampments and site installations.

Gener will place strict contractual requirements on Contractors during the construction phase, aiming to ensure suitable management and final disposal of waste. Additionally, contractors and subcontractors shall agree to comply with regulations and oversight actions established by Law, to be applied to all works of this nature. The planned environmental management manual will prevent the occurrence of any pollution events linked to the Project (**see EIS, Annex 18**).

RES.01 Regulations and Responsibilities

In order to ensure the efficient, safe, and responsible treatment and management of waste matter generated by the PHAM an additional plan has been developed, the "Waste Management Plan for Work Sites, Works Installations, and Encampments", describing the procedures and equipment necessary for the management and disposal of waste produced during the construction of the Project, and which also specifies the responsibilities required under its implementation, what records must be kept, and what reports must be prepared for the purposes of control and oversight (Annex 18 of the EIS).

Gener will enforce implementation and compliance with the Project's environmental measures during construction management, placing strict contractual requirements on Contractors with the aim of ensuring suitable management and final disposal of waste. **RES.02 Location**

a) Handling of solid waste

Infrastructure for the integrated management of solid waste throughout the life of the Project, addressing the full gamut of temporary storage, preparation, and classification for transport, will comprise: waste collection and storage sites at the point where it is generated; areas for non-hazardous waste; and an area for hazardous waste. These waste storage areas, for non-hazardous and hazardous waste, will be located as shown in tables 5.1.1 (pages 7 and 8) and 5.3.1 (pages 11 and 12) in Annex 18 of the EIS, respectively.

Domestic waste and organic waste similar to domestic waste will be disposed of in a sanitary landfill site, while construction waste other than rubble and domestic waste or organic waste similar to domestic waste will be sent to the waste management area for classification, where materials with potential residual value will be returned for reuse or recycling, and the remainder will be dispatched to a sanitary landfill site (Annex 18 of the EIS, page 6).

b) Handling of liquid waste

● Wastewater

Wastewater produced in encampments will be subject to primary and secondary treatment, provided by installing modular activated sludge treatment plants at each encampment. These systems are based on unitary operations, with units designed and equipped to treat wastewater input such as to attain a level of purity sufficient for discharge or reuse with no associated risks to persons or to the environment, in full compliance with the regulations stipulated in Supreme Decree 1-90.

Wastewater generated at work areas, through the use of chemical bathrooms, will be transported to by the contractor in wastewater transport trucks to authorized sites for subsequent treatment.

Sludge generated through wastewater treatment will be removed by the works contractor for transport and disposal at authorized sites on a weekly basis. The sludge will be removed in wastewater transport trucks, and in accordance with the volume of sludge

produced it is expected that each encampment will require 2 to 3 journeys by 6 m³ capacity wastewater transport trucks per week, throughout the construction phase. Meanwhile, during the operations phase, the project will use the existing installations at the existing Alfalfa Plant Control Room, with no requirement to install a new wastewater treatment system, and thus not producing the sludge that such a system would generate.

For more information, see **Annex 18 of the EIS**.

- **Liquid industrial waste**

In view of the characteristics of this type of wastewater, the project plans to install a sequential sedimentation system. In view of this situation, a settling pond will be installed at each work site to permit the separation of liquid industrial waste into clear water and settleable sludge.

(see **Annex 5 of Addendum 1**)

RES.03 Characteristics

The types of waste to be produced during the construction phase, and the characteristics thereof, are as follows:

Characteristics of solid waste

Solid non-hazardous waste

This class of waste includes:

- Construction waste: consisting of wood, piping offcuts, rubble, wires, waste packaging, metals, empty cans and drums used to transport paint and adhesives, and other similar items.
- Domestic waste and other waste similar to domestic waste: basically includes leftover food from canteens, packaging, paper, card, and similar materials.
- Plant waste: consisting of remains of shrubs, weeds, and smaller quantities of tree waste removed from work sites.

Hazardous solid waste

Types of hazardous waste produced by the Project correspond to waste generated in workshops, storage areas, and work sites, such as:

- Solvents
- Oil waste
- Lubricating grease
- Batteries
- Oil filters

Characteristics of liquid waste

Wastewater

This class of liquid waste relates to wastewater from bathrooms, showers, canteens, and other activities conducted within encampments, site installations, and work sites. This wastewater will be subject to primary and secondary treatment, provided by installing modular activated sludge wastewater treatment plants at each encampment.

Liquid industrial waste

Liquid industrial waste shall be generated only through the following activities: concrete production, washing and preparation of aggregates, and washing of truck chassis and load beds, machinery, and tools.

As a result of this fact, this type of liquid waste shall be generated only at work sites.

Meanwhile, wastewater shall not be produced at the Project's encampments, as these areas shall be used only for personnel lodgings.

For more information, see **Annex 18 of the EIS**.

RES.04 Impact

Gener considers the suitable handling of waste produced by the Project to be of particular importance, and to this end it has designed rigorous programs for the handling, collection and storage, transport, and final disposal, reuse or sale of the different forms of waste that shall be generated at the Project's encampments and site installations, as well as its work sites. These programs have been designed specifically taking into account the particular features of the area where the Project is to be implemented, as well as regulations in force and the requirements imposed by the authorities during the Project's environmental evaluation. In general this category includes non-hazardous waste produced during construction activities and from domestic sources (the latter at workers' encampments), and production of this waste will cease at the end of the construction phase:

- Liquid waste will be reused or disposed of in compliance with applicable sector regulations. All discharge of treated wastewater will be conducted at isolated points, generally without the presence of other human use and with low physical and visual accessibility.
- For both hazardous and non-hazardous waste, the Project Owner plans to transport material for disposal in authorized sites, eliminating the possibility of creating centers of soil or water contamination that might have a negative effect on the quality of the area's scenery. The storage areas, rubble, and other materials stored on a temporary basis within site installations shall be removed once construction activities have been completed, and therefore shall have no impact on the landscape.

SLD Health Impact

The Project owner shall take responsibility for ensuring compliance with health and safety regulations, in order to prevent any possible risk to health and physical integrity for the inhabitants of San José Maipo as well as the persons working on the Project.

SLD.02.01 Pollutants

The Project's atmospheric emissions will correspond to dust suspended in the air as a result of earth moving activities (during excavations, loading and unloading, etc.), and the movement of vehicles at surface work areas. Emissions control will be conducted by means of:

- conservation of existing roads currently used by mine trucks,
- all new roads built will be treated with bischofite. Additional information provided in Section I, Question 42 and Section VI, Question 17, in the Addendum.
- use of tarpaulins covering truck loads,
- timely mechanical maintenance of equipment, machinery, and vehicles, and wetting of dusty surfaces
- use of wagons and belt conveyors for the removal of muck from within tunnels, and similar.

The Project Owner has conducted three studies to estimate emissions, which are included

in Annexes 4 and 5 of the EIS. These studies describe the analysis of estimates of atmospheric emissions caused by the PHAM, as well as the Emissions Compensation Program. The study identifies the Project activities that generate emission, quantifies the amount of emissions thus produced, estimates the quantity of emissions for each pollutant during each year of the construction phase, and, finally, develops the Project's emissions compensation program.

Remark N° 92 EIS for connection to the SIC Central Grid

The AES Gener environmental impact study does not specify how the electricity generated will be supplied to the SIC Central Electricity Grid. AES Gener should include full information regarding this sub-project in the EIS, as it is one of the units that make up the PHAM, given the fundamental linkage between the two projects. The same applies with regard to the concession to build and operate the hydroelectric plants, which should also be considered an integral part of this project, and which concession is currently not held by AES Gener.

This remark is presented with the concrete aim of preventing the authorization of one of these projects from implying a superficial examination of the others, in the sense that, if one of these projects is approved, the next will become a matter of "business necessity" for the Project Owner. Conversely, if the EIS addresses the activities of tunneling, water abstraction, power generation, and electricity distribution as a single unit, this will permit an enhanced perspective to be gained regarding the impact of the Project as a whole, such that all of its effects may be correctly evaluated.

Thematic responses

ELE Electrical Installations

The electrical installations presented in the EIS comprise the substation, to be located in the El Sauce area, the characteristics of which are to be found in **Annex 27 of the EIS**; given that the electricity transport layout (cabling and towers) is to be presented to the Environmental Impact Assessment System once all background information is available.

ELE.03 Transmission lines

In view of the project's location, close to Santiago, it is expected that the distance covered by the definitive cabling layout will be short, involving a minimum of sectors not subject to prior intervention. With regard to the specific location of the cabling layout, plans call for the use of the existing high tension power line used by the Queltehue, Volcán, and Maitenes Plants.

Once the layout of the high tension power line has been defined, the Project Owner will submit this plan to the Environmental Impact Assessment System, in accordance with legislation in force. In line with the development of the Compliance Plan for environmental legislation applicable to the Project, the General Regulations applicable in this instance are indicated below:

Decree with Force of Law N°4, dated 05 February, 2007, setting forth the Recast, Coordinated, and Systematized Text of the General Law on Electrical Services.

The General Law on Electrical Services governs the generation, transmission, distribution, and regimen of concessions and tariffs applicable to electrical energy, and the functions of the State with regard to these areas.

Supreme Decree N° 327, Regulations Regarding the General Law on Electrical Services

The Regulations Regarding the General Law on Electrical Services establish, in their 8th Article, that hydroelectric power plants, electrical substations, and transmission lines may be installed without making a request for a concession, when the interested party wishes. These concessions may be provisional (in order to study projects) or definitive. A definitive concession is granted by a supreme decree issued by the Ministry of the Economy, by order of the President of the Republic. Permits relating to electrical installations that do not require concessions are granted by the corresponding Municipal Governments.

For further information and analysis on the aforementioned regulations, with regard to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see **Sections 3.1.6 and 3.1.7 of Chapter 3 of the EIS**, where more detailed versions of this information can be found.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water

from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

PRO.03.01 Intakes

The Alto Maipo Hydroelectric Project (PHAM) plans to capture water resources at eight different points. The Project holds in-stream water rights at each of these points, and the concessions granting rights at most of these points include ecological flow rate stipulations issued by the Directorate General of Water (DGA).

The water intake points are as follows:

For the Alfalfal II Plant: the El Morado Stream, the La Engorda Stream, the Colina Stream, the Las Placas Creek, and the Yeso River. For the Las Lajas Plant: the Alfalfal Plant discharge, and the Colorado River at the Maitenes Intake. For a detailed description of planned installations, see Chapter 2, Section 2.2.2 of the EIS, and attached Annexes 1 and 8.

See Annex 12 of the EIS for a map of intakes in the PHAM area of influence. See Table 2.2.2, in Chapter 2 of the EIS, for the characteristics and descriptions of the intake installation.

For information on the Project's impact on water quality in the area's watercourses arising as a result of the construction of intakes, see Section I, Question 3 in the Addendum.

For the intake maintenance plan, the Chapter 2, Section 2.2.2 of the EIS, and additional information provided in Section I, Question 11 of the Addendum.

For clarifications regarding the El Yeso Reservoir, see Section I, question 27 in the Addendum.

For details on the construction methods and the mitigation and compensation measures planned by the Project to address the environmental impact of the intakes, see Annex 6 of the Addendum.

PRO.03.02 Tunnels

The majority of the Project is planned for installation underground. The general characteristics of the tunnels are described in Chapter 2 of the EIS, Table 2.2.5 (for detailed geological information on the path taken by the tunnels, see Annex 46 of the EIS).

For an evaluation of the impact and environmental management measures associated with underground installations, see Chapter 6 of the EIS.

Annex 45 of the EIS, Hydro-Geology of Underground Works, presents a general description of the geological conditions that are expected to be found along the lengths of the tunnels; expected permeability based on geological knowledge and hydro-geological conditions in the area, incorporating experience gained during the construction of tunnels for the Alfalfal Plant, which has been operative for more than 17 years; as well as a description that includes the design of the tunnels, providing a brief explanation of the methods to be used to reduce and control water seepage.

With regard to the impact of the path taken by the tunnel passing underneath the El Morado Natural Monument, and measures to be taken to respect the area, see Section I, Responses 4, 5, and 6, in the Addendum.

Remark N° 93 Flow rates - "Hanging" channels

A danger exists that a vast number of existing irrigation channels might be left "hanging" - that is, their intakes could be left at a higher level than the rivers that feed them, in view of reduced flow rates in these rivers. It is estimated that this problem could affect the irrigation of more than 500 hectares of agricultural land. AES Gener should conduct studies on a case by case basis to assess this situation, and these studies should be subject to approval by the Directorate General of Water (DGA). This will require the preparation and presentation of a map to be included in the EIS, showing all water intake works located within the Project's area of influence, as well as all natural watercourses subject to intervention.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see **Table 2.3.4** in **Chapter 2 of the EIS**.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that is, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**).

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 94 Noise Emissions

The Environmental Impact Study should take into account the fact that sources of noise located far from settlements may still affect tourism, and that many persons may cease to visit the areas where construction is to be conducted due to the noise and visual effects caused by a construction site of this nature. Harmful effects on local fauna will also occur.

The Environmental Impact Study should also address noise that may be generated by the construction Project's water conduits. Failure to take this point into account will result in many people losing part of their income derived from vehicle rental, transport, entry fees, sale of food, mule rental, horse rental, tourist guide services, etc.

AES Gener should clearly establish in the EIS what actions it will take to mitigate noise emission in areas located far from settlement, but of interest to tourism or frequented by wildlife.

Thematic responses

RSG Risk

The Project Owner possesses a general risk prevention strategy that imposes certain measures on the Project during its different stages of advance. This strategy features the following components:

- a) Measures incorporated into the Project's engineering design.
- b) Systematic verification of compliance with applicable regulations
- c) Establishment of restricted areas
 - c.1) Area restricted due to their archeological, paleontological, or heritage value
 - c.2) Area of natural value that requires protection by the Project
 - c.3) Officially protected area.
- d) Expert supervision during construction
- e) Training regarding environmentally sensitive issues
- f) Internal risk management and accident prevention programs
- g) Separation of works installations and encampments

For further information on each of these points, please see **Chapter 7 of the EIS**, which specifies the **Environmental Management Plan**, the **Risk Control and Prevention Plan** designed for the Project, the safety measures to be adopted in light of the risks identified, and, finally, the **Accident control plan**, to be activated in the event of the failure of the preventive measures taken by the Project Owner. Furthermore, **Annex 32 of the EIS** presents the **Risk and Contingency Prevention Plan** for contractors.

RSG.03 Blasting

Excavation methods using explosives will be used for the excavation of a proportion of the tunnels involved in the Project. Other tunnels will be excavated using a Tunnel Boring Machine, as described in **Section 2.3.2.2 of the EIS**. The surface points where blasting will lead to perceptible effects are

located close to the entrances of the tunnels that are to be constructed using the traditional drill and blast excavation technique (**Section 6.4.1.2 and Section 6.4.1.3 of the EIS, and Section 6, Question 26 in the Addendum**). At surface locations in areas where tunnels are to be excavated using the traditional method, no vibrations will be caused that could lead to risks of landslides, rock falls, and landslips resulting from the construction of the tunnels, because these excavation techniques will be used at a great depth below the surface.

Noise from blasting will only be audible during the opening of the ends of the tunnels. Once inside the tunnels, excavation works (including detonations) will not be audible, and therefore will not constitute a significant source of noise, and audible blasting will therefore only occur while the ends of the tunnels are being excavated. It is estimated that there will be 2 or 3 detonations per day at each work site. Based on these

levels, added to the background noise in each area, it was determined that noise will not rise above the maximum level permitted under MINSEGPRES Supreme Decree 146/97. For more information on this topic, see **Section 6.4.1.2 of the EIS** and **Section 8.2.2 of the EIS**, which describe the noise and vibration monitoring program associated with the blasting activities, as established in **Section 6, Question 41 of the Addendum**.

It is important to point out that a controlled intervention will be completed in advance of blasting, consisting of the installation of work platforms, through the removal of vegetation and the rescue of individual plants and/or animals of conservation interest that present low mobility, limited populations, and endemism, and other characteristics of the project and the range of the species in question (see Annex 4 of the Addendum), in particular through the implementation of the "Wildlife Rescue and Relocation Plan".

Regarding the construction of the El Volcán Tunnel, located beneath the El Morado Monument, the depth of the tunnel will vary between 550 m and over 1500 m. No impacts are expected relating to vibrations reaching the El Morado Glacier. For more information, see **Addendum 1, Section 6, Response 13 and Section 1, responses 4, 5 and 6**.

With regard to safety measures planned applying to the handling and storage of explosives, specified in Annex 32 of the EIS, regulatory stipulations for risk prevention and emergency control are provided that will apply to all contracting of works and/or services by Gener, in compliance with the requirements set forth in Law 16,744, Article 66 part 2. See also **Addendum 1, Section 1, Question 35**.

SLD Health Impact

The Project owner shall take responsibility for ensuring compliance with health and safety regulations, in order to prevent any possible risk to health and physical integrity for the inhabitants of San José Maipo as well as the persons working on the Project.

SLD.03 Acoustic

In the field of Environmental Impact, specifically acoustic impact, the Project Owner has conducted a wide-ranging study to estimate acoustic emissions generated during the construction of the PHAM. For more information on the acoustic impact of the PHAM, and methodologies, modeling techniques, and actions to be taken to minimize such impact, please see **Annex 30 of the EIS** and **Section II, Question 8 in the Addendum**.

Plans for blasting activities, specifically including the frequency, quantity, timing, and work periods of blasting, will be determined on site in accordance with the characteristics of each works activity and work site. Works installation working days will be designated to prioritize the completion of surface works during the

daytime (8:00-21:00 hrs.); for blasting activities, plans call for an information program at the time of the activity, defining and clarifying the periods when noise-producing activities will take place, in order to integrate the community into efforts towards the completion of the Project. Another point worthy of emphasis is that the work sites (tunnel excavation, access windows, and entrances/exits) will not be sited close to settlements, thus preventing most of the potential acoustic impact that could be caused by the PHAM.

Wildlife rescue will be conducted through animal rescue activities based on the trapping of reptiles and amphibians before explosives are used, before service tracks are built, and before the modification of river flow.

Finally, and in order to comply with the requirements set forth above, the Project Owner shall be subject to:

1. Supreme Decree 146 (Establishing Standards on the Emission of Nuisance Noise Generated by Fixed Sources) establishing maximum permissible sound pressure levels, corrected according to technical criteria to evaluate and classify nuisance noises generated by fixed sources affecting the community, such as industrial, commercial, leisure, and artistic activities.
2. Exempt Decree 130 (Establishing restrictions on the movement of cargo trucks). The movement of trucks larger than 4 tons will be suspended from 14:00 hours on Saturdays through to midnight on each Sunday night on Route G-25 and Route G-421.

For more information on the acoustic impact of the PHAM, and regulations (Chapter 6 of the EIS), mitigation measures, methodologies, modeling techniques, and actions to be taken to minimize such impact, please see Annex 30 of the EIS, as mentioned above.

Finally, in order to verify the effectiveness of the mitigation measures taken, noise monitoring will be conducted at 8 sensitive points, following the procedure established in MINSEGPRES Supreme Decree 146/97, in order to verify compliance with the maximum permitted limits for sound pressure level (see details in **Chapter 8 of the EIS, Section 8.2.2**).

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. In parallel, the study investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 95 Noise

With reference to the information presented in Chapter 2, Page 56, an explanation should be provided as to what media will be used to indicate the times and dates of particularly noisy works activities.

If the implementation of the Project is authorized, AES Gener should refrain from generating noise of any kind during weekends and holidays, in both populated areas and zones of interest for tourism.

Thematic responses

RSG Risk

The Project Owner possesses a general risk prevention strategy that imposes certain measures on the Project during its different stages of advance. This strategy features the following components:

- a) Measures incorporated into the Project's engineering design.
- b) Systematic verification of compliance with applicable regulations
- c) Establishment of restricted areas
 - c.1) Area restricted due to their archeological, paleontological, or heritage value
 - c.2) Area of natural value that requires protection by the Project
 - c.3) Officially protected area.
- d) Expert supervision during construction
- e) Training regarding environmentally sensitive issues
- f) Internal risk management and accident prevention programs
- g) Separation of works installations and encampments

For further information on each of these points, please see **Chapter 7 of the EIS**, which specifies the **Environmental Management Plan**, the **Risk Control and Prevention Plan** designed for the Project, the safety measures to be adopted in light of the risks identified, and, finally, the **Accident control plan**, to be activated in the event of the failure of the preventive measures taken by the Project Owner. Furthermore, **Annex 32 of the EIS** presents the **Risk and Contingency Prevention Plan** for contractors.

RSG.03 Blasting

Excavation methods using explosives will be used for the excavation of a proportion of the tunnels involved in the Project. Other tunnels will be excavated using a Tunnel Boring Machine, as described in **Section 2.3.2.2 of the EIS**. The surface points where blasting will lead to perceptible effects are

located close to the entrances of the tunnels that are to be constructed using the traditional drill and blast excavation technique (**Section 6.4.1.2 and Section 6.4.1.3 of the EIS, and Section 6, Question 26 in the Addendum**). At surface locations in areas where tunnels are to be excavated using the traditional method, no vibrations will be caused that could lead to risks of landslides, rock falls, and landslips resulting from the construction of the tunnels, because these excavation techniques will be used at a great depth below the surface.

Noise from blasting will only be audible during the opening of the ends of the tunnels. Once inside the tunnels, excavation works (including detonations) will not be audible, and therefore will not constitute a significant source of noise, and audible blasting will therefore only occur while the ends of the tunnels are being excavated. It is estimated that there will be 2 or 3 detonations per day at each work site. Based on these

levels, added to the background noise in each area, it was determined that noise will not rise above the maximum levels permitted under MINSEGPRES Supreme Decree 146/97. For more information on this topic, see **Section 6.4.1.2 of the EIS** and **Section 8.2.2 of the EIS**, which describe the noise and vibration monitoring program associated with the blasting activities, as established in **Section 6, Question 41 of the Addendum**.

It is important to point out that a controlled intervention will be completed in advance of blasting, consisting of the installation of work platforms, through the removal of vegetation and the rescue of individual plants and/or animals of conservation interest that present low mobility, limited populations, and endemism, and other characteristics of the project and the range of the species in question (see Annex 4 of the Addendum), in particular through the implementation of the "Wildlife Rescue and Relocation Plan".

Regarding the construction of the El Volcán Tunnel, located beneath the El Morado Monument, the depth of the tunnel will vary between 550 m and over 1500 m. No impacts are expected relating to vibrations reaching the El Morado Glacier. For more information, see **Addendum 1, Section 6, Response 13 and Section 1, responses 4, 5 and 6**.

With regard to safety measures planned applying to the handling and storage of explosives, specified in Annex 32 of the EIS, regulatory stipulations for risk prevention and emergency control are provided that will apply to all contracting of works and/or services by Gener, in compliance with the requirements set forth in Law 16,744, Article 66 part 2. See also **Addendum 1, Section 1, Question 35**.

SLD Health Impact

The Project owner shall take responsibility for ensuring compliance with health and safety regulations, in order to prevent any possible risk to health and physical integrity for the inhabitants of San José Maipo as well as the persons working on the Project.

SLD.03 Acoustic

In the field of Environmental Impact, specifically acoustic impact, the Project Owner has conducted a wide-ranging study to estimate acoustic emissions generated during the construction of the PHAM. For more information on the acoustic impact of the PHAM, and methodologies, modeling techniques, and actions to be taken to minimize such impact, please see **Annex 30 of the EIS** and **Section II, Question 8 in the Addendum**.

Plans for blasting activities, specifically including the frequency, quantity, timing, and work periods of blasting, will be determined on site in accordance with the characteristics of each works activity and work site. Regarding works activity scheduling, priority will be placed on completion of surface works during the daytime (8:00-21:00 hrs.); for blasting activities, plans call for an information program at the time of the activity, defining and clarifying the periods when noise-producing activities will take place, in order to integrate the community into efforts towards the completion of the Project.

Another point worthy of emphasis is that the work sites (tunnel excavation, access windows, and entrances/exits) will not be sited close to settlements, thus preventing most of the potential

acoustic impact that could be caused by the PHAM.

Wildlife rescue will be conducted through animal rescue activities based on the trapping of reptiles and amphibians before explosives are used, before service tracks are built, and before the modification of river flow.

Finally, and in order to comply with the requirements set forth above, the Project Owner shall be subject to:

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Remark N° 96 Blasting

The location, duration, quantity, and frequency of blasting should be specified for all sectors.

Thematic responses

RSG Risk

The Project Owner possesses a general risk prevention strategy that imposes certain measures on the Project during its different stages of advance. This strategy features the following components:

- a) Measures incorporated into the Project's engineering design.
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located close to the entrances of the tunnels that are to be constructed using the traditional drill and blast excavation technique (**Section 6.4.1.2 and Section 6.4.1.3 of the EIS, and Section 6, Question 26 in the Addendum**). At surface locations in areas where tunnels are to be excavated using the traditional method, no vibrations will be caused that could lead to risks of landslides, rock falls, and landslips resulting from the construction of the tunnels, because these excavation techniques will be used at a great depth below the surface.

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levels, added to the background noise in each area, it was determined that noise will not rise above the maximum levels permitted under MINSEGPRES Supreme Decree 146/97. For more information on this topic, see **Section 6.4.1.2 of the EIS** and **Section 8.2.2 of the EIS**, which describe the noise and vibration monitoring program associated with the blasting activities, as established in **Section 6, Question 41 of the Addendum**.

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Remark N° 97

Labor Hiring

The Project Owner overestimates job creation, whereas the contractor and not the company itself shall be in charge of hiring. Gener should:

- * Quantify the amount of labor that it shall hire in the district.
- * Describe the positions to be filled.

* Establish a binding agreement between the Project Owner and the Municipal Government whereby Gener agrees to source 100% of the persons who have registered at the labor brokerage office.

Thematic responses

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.01 Jobs in the District

Local labor availability is estimated based on figures from the Labor Brokerage and Information Office. This information will be made available to construction contractors so that they can preferentially hire local workers. According to information compiled at the Project Office in San José de Maipo, the project has registered a total of 980 potential project workers, of whom 390 are unemployed, broken down as follows:

Mine workers:	105
Carpenters, Builders, and Rebar Layers:	157
Heavy Machinery Operators:	131
Non-specialized day laborers:	39
Drivers:	87
Specialized technical personnel:	60
Welders:	26
Foremen and supervisors:	7
Graduate professionals:	20
Cleaning, security, and canteen workers:	120
Administrative personnel:	91
Other, misc.:	139

The average project workforce during the construction phase (5 years) is estimated at 2000 persons, and during the Citizen Participation process the company has agreed to ensure that an average of at least 500 local persons will be on the payroll during the construction of the Project.

SOC.01.01 Requirements

In view of the characteristics and scale of the Project, personnel with specific qualifications will be required for the operation and maintenance of plant machinery and equipment, during the operations phase. Conversely, during the Project Construction Phase, it is projected that labor requirements will create jobs not only for mining workers, but also for machinery operators, drivers, and both skilled and unskilled construction personnel, the latter working mainly as day laborers and assistants.

The population of the Project's area of direct influence has been found to possess levels of training and specialization (occupation as defined under the CIIU code) that shall permit them to access both skilled and unskilled work positions created by the Project.

SOC.01.02 Working conditions

To date no schedule exists specifying labor requirements for the full duration of the construction phase. Detailed information specifying jobs created under average and peak labor requirements, broken down by labor requirement dynamics for each encampment, will only be available once the Project Owner has tendered the works contracts.

During the operations phase, it is expected that personnel requirements will amount to approximately 80 positions available, required for power plant operations and maintenance activities. Unlike work positions created during the construction phase, the jobs created in the operations phase will be permanent (EIS, Chapter 6, Section 6.4.2.4).

The Project Owner will provide for coordination between the construction works contractors, the Labor Brokerage Office, and the Municipality of San José de Maipo, regarding local labor required and jobs sought. The PHAM has accepted a commitment to incentivize works contractors to prioritize local contracting of labor required.

No prior training is planned in advance of the Construction Phase. However, such training will form part of the programs implemented in the more advanced phases of the project.

Remark N° 99 Supply Purchase Agreements

The Project Owner overestimates the benefit that will be generated for the community through the purchase of supplies and the presence of 20 encampments.

The Project Owner should enter into a binding agreement with the SJM Chamber of Commerce and Tourism, agreeing that all supplies required in the functioning of the encampments shall be acquired in the district.

Thematic responses

Specific response

The Project owner is not able to agree to this request because it goes against the concepts of free competition, and it is also unable to oblige contractors to purchase their supplies in the district.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social

Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment.

By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.05 Promoting entrepreneurship

The company has agreed to use its **Fundación Maitenes** foundation to set aside an **annual fund over a 10 year period starting in 2010**, to support local residents who formulate tourism development business plans for implementation in the area. These projects will be financed through funds open for competitive tenders; submissions will be evaluated on their own merit by a council of community representatives, which will select which projects will be funded.

The initiative to be implemented by the Fundación Maitenes may be linked to projects in progress run by public institutions and services in the district, related to the two lines of action that the foundation has agreed to support. This linkage may help to strengthen state-run initiatives and foster sustainability over the course of time for the actions supported by the foundation, during the period in which the program is active.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. In parallel, the study investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 100**Irrigation** **User**
Communities

The Project Owner should attach written consent by the "El Manzano Channel" and "Maurino Channel"

Thematic responses

Specific response

The Project Owner reiterates its commitment to ensuring that necessary infrastructure exists in the river to permit water to enter the channels at all times, in accordance with the rights granted and the availability of the river throughout the life of the PHAM project.

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water**rights**

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in
Chapter 2 of the
EIS.

AGU.02.01**Irrigation**

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02
channels**"Hanging"**

shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

Remark N° 101 El Manzano EIS

The EIS presented by Gener does not include impact that will be generated by the PHAM at El Manzano.

* The EIS should include:

* Identification, prediction, interpretation, mitigation plan, and evaluation of the impact that will be caused, particularly with regard to irrigation systems.

Thematic responses

Specific response

The Project Owner reiterates its commitment to ensuring that necessary infrastructure exists in the river to permit water to enter the channels at all times, in accordance with the rights granted and the availability of the river throughout the life of the PHAM project.

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see **Table 2.3.4**

in Chapter 2 of the EIS.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that is, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact

shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of**

flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum.**

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Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility

(Addendum, Section 5, Question 2).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station Northing	Coordinates (UTM) Easting
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Remarks and Responses

Alto Volcán	Stream gauge station La Engorda Stream Bridge	406,157	6,259,100
Alto Volcán	Rain gauge station El Volcán River Bridge (Volcán	460,487	6,358,143
Alto Volcán	Control Station La Engorda Intake	407,468	6,259,751
Alto Volcán	Control Station Las Placas Intake	406,780	6,260,782
Alto Volcán	Control Station Colina Intake	407,181	6,260,081
Alto Volcán	Control Station El Morado Intake	405,768	6,261,231
Yeso River	Rain gauge station PBN (15)	391,504	6,262,449
Yeso River	Control Station El Yeso Intake	399,666	6,272,077
Colorado River	Stream gauge station El Sauce	380,449	6,287,261
Colorado River	Intake control station Colorado River	389,063	6,292,501

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 102

Restrictions Placed on the Usage of Water Rights in the Yeso River

- * Gener holds rights over water in the Yeso River amounting to 15 m³/sec. These rights were granted without ecological flow rate requirements. The Project plans to abstract 15 m³/sec Of water 700 m downstream of the reservoir.
- * Although the original rights acquired do not contain a stipulated ecological flow rate, this measure should be imposed by the SEIA as a mitigation measures - that is, a restriction on the usage of the rights held.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively. Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 from the year 1990, in the Public Registry of Water Usage Rights, maintained by the Public Water Registry (Catastro Público De Aguas) (**see the Addendum, Section V, Question 24, Part vi**).

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4 in Chapter 2 of the EIS**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating

in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of

Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

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With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

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The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán	Stream gauge station	
	406,157	6,259,100	
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1) **Chapter 3 of the EIS** provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;

- The ways in which the Project will ensure compliance with these regulations. The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

PRO.O 1.01 Compensation

The concept of compensation refers to the act of indemnifying damages or harm caused. Within the framework of the EIS, the Project Owner has issued a proposal to the competent authority regarding a suite of environmental management measures aiming to minimize, compensate, and restore the Project's impacts, making their implementation sustainable (Chapter 6 of the EIS).

In this regard, compensation is understood to be included in the spirit or end goal of the environmental management measures proposed by the Project Owner, following the evaluation of the direct and indirect effects of the PHAM on each of the environmental components stipulated in Supreme Decree 95, SEIA Regulations.

Remark N° 103

Tourism

- * Given that, in view of its characteristics and natural monuments, the Cajón del Maipo valley has been declared a ZOIT Zone of National Interest, the Project Owner is requested to analyze and evaluate to what extent the impacts to be generated by the PHAM in the area subject to intervention are compatible with the district's role as a tourism destination.
 - * The Project Owner must identify the current and potential tourism demand in the region, in both qualitative and quantitative terms.
 - * Determine tourism service availability in the context of demand.
- * Describe and classify the tourism companies with special interests considered in the district, and the promotion of tourism service provision in the area.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative,

that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **TUR Tourism Scenery**

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.01 River sports

During the operations phase, the activities of the PHAM shall not directly or indirectly interfere with tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. Furthermore, the PHAM shall have no significant effect on boating activities on the Maipo River as a result of reductions in river flow rate; an analysis is presented in Annex 17 of the Addendum modeling a number of hydrological scenarios (1), concluding that the PHAM shall not affect the current situation in rafting and kayaking activities conducted in the area between San Gabriel and San José de Maipo.

In order to establish an analysis comparing the current Maipo River boating situation with predictions for the situation with the Project operational, the variables of flow rate, river width, and water depth were modeled, as valid indices to establish conditions for boating activities on the Maipo River.

This analysis showed that the Project shall not interfere with tourism activities conducted on the Maipo River, in view of estimates that in a dry year, the magnitude of variations in flow rate and water depth will not cause interference with boating activities.

For more information, see **Annex 17 of Addendum 1**.

- (1) The hydrological analysis used to evaluate reductions in flow rate is based on a statistical record going back 50 years, thus ensuring that seasonal and annual variations are incorporated into the analyses conducted.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business

initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 104

Ecological flow rates

- * The ecological flow rate should be defined by the DGA, not by the Project Owner
- * The point where these flow rates is to be measured and monitored should be sited at the mouth of the Colorado River.
- * Flow rate monitoring should include the participation of outside agencies, that are not hired by the company.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of

habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Q_e) approved by the DGA. In the case of the PHAM,

the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses. Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán	Stream gauge station	6,259,100
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 105

Decline in Flow Rates

*The impact to arise as a result of the decline in flow rates in the watercourses subject to intervention is not a cosmetic effect that is justified through the absence of tourism-related infrastructure.

*The Project Owner must provide documented background information forming the grounds for the prediction, identification, and interpretation of the impact that these actions shall cause.

* It should also describe the actions that it shall take in order to prevent or minimize all significantly negative effects.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.04 Monitoring and control of flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

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The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project. For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	406,157		
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
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For more information, see **Annex 17 of the Addendum**.

Remark N° 106
Impact in Watercourses Subject to Intervention

The Project Owner should take into account variables arising as a result of the formation of flat, open watercourses at a level closer to the surface. Temperature increased from sunlight, loss of water through evaporation, and the process of eutrophication can arise as a result of these conditions.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally

complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Q_e) approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

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Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	Rain gauge station		Stream gauge station
	406,157		6,259,100
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 107 Transfer of Water Rights

The approval of transfer of title over water rights should be subject to the maintenance of ecological flow rates established by the DGA.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-

-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El

Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order

to maintain ecosystems. The operation and construction of the power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 108 CONAMA EIS

Given that the principal functions of CONAMA include "Administration of the EIS System", why is it permitted that a project be resubmitted when it intentionally omits, for instance, the impact to be generated in an entire settlement, as is the case in El Manzano? The same situation occurs regarding all of the watercourses subject to intervention under this project, the impact of which is described as a "cosmetic effect". In Law 19,300, Art. 2, Part c, it is stated that "**Environmental damage** [means] any significant loss, decline, detriment, or harm caused to the environment, or to one or more of its components", and the Project Owner has clearly recast environmental damage as a cosmetic effect in order to obtain its RCA. CONAMA, in its role as the administrator, should not only reject the resubmission of the PHAM under these conditions, it should also apply sanctions against this situation.

Thematic responses

OTR Other

This section relates to certain special situations that could not be categorized, or that are linked to specific requests, disqualifications, or situations that feature a clear political component, against either the environmental authority or the Project Owner.

OTR.02 CONAMA

Remark N° 109
Citizen Participation Meetings

At these meetings the Project Owner makes presentations, and these presentations are riddled with omissions, distortions, and bare faced lies. This fact has been observed by all of those present, including CONAMA, should be cause for drastic sanctions, and not aided by silence on the part of CONAMA.

Both the EIS system and the citizen participation meeting system should be subject to self-assessment, in terms of efficiency and transparency.

Thematic responses

OTR Other

This section relates to certain special situations that could not be categorized, or that are linked to specific requests, disqualifications, or situations that feature a clear political component, against either the environmental authority or the Project Owner.

OTR.02 CONAMA

Remark N° 110

Evaluation of the EIS System

An EIS should provide documented background information that can be used to predict, identify, and interpret its environmental impact and describe the action or actions that it shall take in order to prevent or minimize all significant adverse effects, so that, based on this background information, the project can be evaluated - in this case, by COREMA.

However, the PHAM Project Owner has not included this background information. (E.g. Impact at El Manzano); we must therefore assume that COREMA is to magically guess this impact, in order to make its observations on the project.

What happens if it is not capable of magical guessing? This clearly shows that the system as it is currently used is not efficient; that it is a system that can and should be improved, as the question of whether the correct information reaches those who are to make decisions regarding this project cannot be entrusted to the community.

- The inclusion of omissions, distortions, and falsified data in a EIS with the aim of obtaining an RCA, without accepting the cost of the impacts concerned, should be seen as a crime and sanctioned as such.

Thematic responses

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles,

70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.01 Regulations

The Project Owner shall comply with all legal environmental and sector-based regulations and requirements in force and applicable to the Project during the different phases of its development. The Project Owner has guaranteed compliance with the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and compliance with sector environmental permits.

Environmental regulations that apply to the Project have been identified based on its activities' potential environmental impacts affecting flora and fauna. The full extent of these regulations is included in **Chapters 3 and 4 of the EIS, and in Section 2, Question 1 in Addendum 1**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph

(EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

**PRO.02 EIS Additional and
Complementary Information**

In accordance with consultation procedures conducted by oversight services, further studies

and information have been incorporated into Addendum 1, which complements existing information provided in the EIS. Regarding ecological flow rates (**Annex 17**), cultural heritage (**Annex 14**) and the management of summer grazing areas (**Annex 6**).

Remark N° 111 1. Water Rights

The Project does not hold concessions for water rights at any abstraction point. A technical report exists, issued by the DGA, that concludes that it would not be possible to make available the water rights requested by Gener because there is no physical availability of water. How can a project of this nature be evaluated if it does not hold the required water rights? Will the Project attempt to take over water rights held by third parties?

Furthermore, a vast number of complaints have been lodged opposing these transfers of rights, in the Upper Maipo area and in the Colorado River.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in
**Chapter 2 of the
EIS.**

AGU.04 Water flow in rivers and

streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

Remark N° 113

3. Ecological Flow Rates and Baseline Studies

The Project establishes an ecological flow rate for the Colorado River at 0.6 m³/s. This flow rate is outside of the bounds stipulated by law, requiring (as a minimum) that the value must be 10% of average annual flow rate - in this case, 3.1 m³/s plus environmental demand.

Our studies indicate that downstream of the intakes, the Yeso River dries out, the La Engorda Stream dries out, the Colina Stream dries out, the Las Placas Stream dries out, the Morado Stream dries out, and the Colorado River is left with a minimal flow rate. Ecological flow rates are determined based on the Environment Base Law, Law 19,300, and respecting rights held by third parties.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

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Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications

in the natural state of the hydrological system relate to the presence of the Alfafal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of

Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	Rain gauge station		
	406,157		
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
Alto Volcán	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
Alto Volcán	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
Alto Volcán	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
Alto Volcán	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
Yeso River	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
Yeso River	PBN (15)		
Yeso River	Control station	399,666	6,272,077
Yeso River	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
Colorado River	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
Colorado River	Colorado River		

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For more information, see **Annex 17 of the Addendum**.

Remark N° 114

4. Impact on Sediments and Aggregates

The potential aggregates production in the river basin will decline by around 3 million tons per year, which equates to more than 22% of total. This will affect the infrastructure of intakes, bridges, and water abstraction works, as well as the specific activity of aggregates extraction. If the authority has imposed a freeze on aggregates extraction permits in the first section of the Maipo River, how can it grant permission for a project that will extract 22% of all aggregates produced in the river basin?

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

ivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.05.01 Drinking water quality

The process of hydroelectric power generation does not affect the physical/chemical qualities of water. Additionally, the PHAM does not plan to implement regulation installations that retain sediment. Thirdly, downstream of the discharge point the natural river conditions are maintained with regard to flow rate and physical/chemical properties.

During the construction of installations to be located in watercourses, the free-flowing course of the river is maintained through the construction of diversions through pipes laid along the river course for such purposes, or through channels that divert all flow, allowing free water circulation with no effect whatsoever on quality (see **Section I, Question 28, in the Addendum**).

The Project owner shall not make use of the Lo Encañado Lake or water usage rights owned by Aguas Andinas S.A. for this Project, instead opting to forgo usage of these resources and to replace the role that would have been fulfilled by the Lo Encañado Lake with a forebay located on a widening of the Alfalfal II plant headworks, located in the Alto Aucayes area on the Colorado River Valley (for details, see **EIS 2.2.1**). The Lo Encañado area shall be assigned a status of controlled access area at all times: it shall not be subject to any intervention whatsoever. The Project Owner has made available a Water Quality Monitoring Program, with specifications for application during both the construction and operations phases. This program espouses a commitment to verify the effectiveness of environmental control measures designed to minimize the effects of works construction activities during the construction phase.

For further information on the Monitoring Program, see **Sections 8.2 and 8.3 in**

Chapter 8 of the EIS.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfal Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on

background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity. It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence. Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area. The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (AGU.06.01), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity. Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence. Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted. It can be concluded that the Maipo River system can be managed such that, With the Project operational, present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them. Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

AGU.06.03 Maipo River Sand Production

With regard to the extraction of aggregates in the Maipo River, during the operations phase of the PHAM, the Project will not modify current natural sediment (aggregates) transport dynamics occurring in the river. In effect, under the natural dynamics, sediment transport takes place mainly in the months of November, December, and January, as a result of snow and ice melt in the high mountains, and it is during this season that variations in flow rate in the Maipo River caused by the project stand at their lowest levels. The same behavior applies to winter season rises in river level. It must be pointed out that the PHAM returns water to the Maipo River in the Las Lajas area, located upstream of the El Canelo zone, and therefore downstream of this point the river's flow dynamics with the project shall be identical to those currently observed. It is of great importance to observe that currently, without the PHAM in operation, slightly downstream of the Las Vertientes area (in the La Obra stretch of the river), during certain times of the year flow rate in the Maipo River watercourse drops significantly, leaving the river bed dry, due to water abstraction at the following intakes: La Sirena Channel, San Carlos Channel, Independent Intake owned by Aguas Andinas, etc. Average water abstraction flow rates attributable to the main drinking water and irrigation intakes, many of which also make use of hydroelectric power as a byproduct, but discounting the effects of existing hydroelectric plants on these channels that discharge directly into the intakes, amounts to 113 m³/second, which is equal to the average annual flow rate in the Maipo River at Las Vertientes. Depending on water availability, the annual abstraction rate at these intakes varies between 78 and 164 m³/second. This situation clearly explains the high level of perturbation observed in the behavior of the Maipo River watercourse downstream of Las Vertientes, where the riverbed is dry except during periods of increased water level and in unusually wet years. It is for this reason that the Project Owner asserts that its activities will have no impact on the current situation in the sand extraction sites located on the Maipo River.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district. In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district. During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain

climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for

group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. The study also investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 115

5. Impact on aquatic flora and fauna

The Maipo Valley features an extremely high level of plant diversity, which has been studied by renowned botanists. Its aquatic plant and animal life also show a diversity of species described. No impact study has been conducted regarding high diversity aquatic plant and animal life, in an area that is designated by laws as a Priority Biodiversity Conservation Area.

Thematic responses

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles,

70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neoporteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo Spinolosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Lilolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed

will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

F&F.02.02 Mitigation

Aquatic flora and fauna

The Project calls for a suite of multi-purpose environmental management measures that aim to minimize its effects on living organisms, including: minimization of watercourse areas to be subject to intervention by prioritizing such works for late summer and early fall seasons (period of lowest flow rates), the adoption of special precautions to prevent accidental spillages into watercourses (prohibition of the storage of lubricant drums in or near watercourses, etc), and permanent maintenance of ecological flow rates.

For more detailed information, including technical documentation that complements the information described above, see Annex 17 of the Addendum.

Terrestrial Flora and Vegetation

In order to prevent and/or minimize the Project's effects on plant life, it plans to adopt a number of integrative measures: micro-routing in advance of starting work on-site, in order to identify specimens of plants listed in any conservation category and subject to impact; compensation with the planting of 10 specimens for every one destroyed, in the case of non-woodland species listed for conservation; implementation of a woodland management plan applicable to woodland areas, which describes its measures in accordance with Article 5 of the Woodland Law; implementation of vegetation restoration plans at muck disposal sites, encampments, artificial slopes, and tunnel access terraces (EIS, Annexes 7 and 29). More in-depth information on complementary measures is provided in Annex 6 of Addendum 1.

Terrestrial fauna

Specific wildlife environmental management measures have been proposed for each particular species, taking into account prior experience in the success of these measures in similar projects. These measures will be implemented in continual coordination with the Servicio Agrícola y Ganadero. Principal measures include: capture of individuals belonging to species of conservation interest for rescue and relocation; controlled perturbation actions; and habitat replacement. Other measures are based on the use of signage, training for Contractors, and contractual requirements for on-site supervision (see details in Section 6.4.1.6 of the EIS).

See Annex 4 of the Addendum for the native wildlife rescue and relocation plan.

Remark N° 116

6. Sustainability in the Maipo River Basin

The Company does not hold the corresponding water rights, and the Baseline studies are therefore not valid. The Project does not comply with the Environmental Impact Assessment System. The company does not recognize the impacts that shall arise as a result of the extraction of water resources. The Project is not capable of generating 530 MW. Data studied indicate that the company does not possess the water resources necessary to operate the Project, and does not hold corresponding water rights.

The Gener PHAM Project is not compatible with the sustainability of the Maipo River Basin.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS.**

This section presents information characterizing the basins and tributaries of the Volcán,

Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex 13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS.**

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

Remark N° 117 Sediments and Aggregates Transported by the Maipo River

As a result of water abstraction in the higher reaches of the river basin, Annex 20 of the Environmental Impact Study indicates that there will be a decline in the transport of aggregates by the river, and in its capacity to transport sediment. What impact will this situation have on the river's sandbanks, and on the extractions of aggregates where legal concessions exist for this activity? This situation is a threat to legally constituted rights, and to sources of employment related to the extraction and sale of aggregates for use in construction. Many families living in San José de Maipo have traditionally made their living through this activity and, with rights to do so legally constituted, continue to do so.

This impact on the resources is **NEGATIVE AND IRREVERSIBLE** (implying their destruction) and therefore must be taken into account.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.06 Sediments

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**Chapter 6.1 of the Sedimentation Study** presented in **Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.03 Maipo River Sand Production

With regard to the extraction of aggregates in the Maipo River, during the operations phase of the PHAM, the Project will not modify current natural sediment (aggregates) transport dynamics occurring in the river.

In effect, under the natural dynamics, sediment transport takes place mainly in the months of November, December, and January, as a result of snow and ice melt in the high mountains, and it is during this season that variations in flow rate in the Maipo River caused by the project stand at their lowest levels. The same behavior applies to winter season rises in river level.

It must be pointed out that the PHAM returns water to the Maipo River in the Las Lajas area, located upstream of the El Canelo zone, and therefore downstream of this point the river's flow dynamics with the project shall be identical to those currently observed.

It is of great importance to observe that currently, without the PHAM in operation, slightly downstream of the Las Vertientes area (in the La Obra stretch of the river), during certain times

of the year flow rate in the Maipo River watercourse drops significantly, leaving the river bed dry, due to water abstraction at the following intakes: La Sirena Channel, San Carlos Channel, Independent Intake

owned by
Aguas
Andinas, etc.

Average water abstraction flow rates attributable to the main drinking water and irrigation intakes, many of which also make use of hydroelectric power as a byproduct, but discounting the effects of existing hydroelectric plants on these channels that discharge directly into the intakes, amounts to 113 m³/second, which is equal to the average annual flow rate in the Maipo River at Las Vertientes. Depending on water availability, the annual abstraction rate at these intakes varies between 78 and 164 m³/second.

This situation clearly explains the high level of perturbation observed in the behavior of the Maipo River watercourse downstream of Las Vertientes, where the riverbed is dry except during periods of increased water level and in unusually wet years.

It is for this reason that the Project Owner asserts that its activities will have no impact on the current situation in the sand extraction sites located on the Maipo River.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. The study also investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 118

1. Water Rights

The Project does not hold concessions for water rights at any abstraction point. A report prepared by the Directorate General of Water (DGA) indicates that this water does not physically exist, and that if any rights come to be granted, the flow rate in question will not be known; therefore, the baseline study is not valid, as it is based on suppositions regarding flow rates.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see **Table 2.3.4** in **Chapter 2 of the EIS.**

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site

information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information,

see **Annex 17** of the **Addendum**.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

Remark N° 119

2. Impact on Production Activities: Tourism

The Project is designed to minimize impact on tourism infrastructure, with point classifications and in relation with highway-related issues. This activity's real-world contribution to the District must be identified, along with the way in which it will be affected by reductions in flow rates, damage to ecosystems, access to mountain areas, impact on the landscape from power transmission lines.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

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For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally

complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's

high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **ELE Electrical Installations**

The electrical installations presented in the EIS comprise the substation, to be located in the El Sauce area, the characteristics of which are to be found in **Annex 27 of the EIS**; given that the electricity transport layout (cabling and towers) is to be presented to the Environmental Impact Assessment System once all background information is available.

ELE.03 Transmission lines

In view of the project's location, close to Santiago, it is expected that the distance covered by the definitive cabling layout will be short, involving a minimum of sectors not subject to prior intervention. With regard to the specific location of the cabling layout, plans call for the use of the existing high tension power line used by the Queltehues, Volcán, and Maitenes Plants.

Once the layout of the high tension power line has been defined, the Project Owner will submit this plan to the Environmental Impact Assessment System, in accordance with legislation in force. In line with the development of the Compliance Plan for environmental legislation applicable to the Project, the General Regulations applicable in this instance are indicated below:

Decree with Force of Law N°4, dated 05 February, 2007, setting forth the Recast, Coordinated, and Systematized Text of the General Law on Electrical Services.

The General Law on Electrical Services governs the generation, transmission, distribution, and regimen of concessions and tariffs applicable to electrical energy, and the functions of the State with regard to these areas.

Supreme Decree N° 327, Regulations Regarding the General Law on Electrical Services

The Regulations Regarding the General Law on Electrical Services establish, in their 8th Article, that hydroelectric power plants, electrical substations, and transmission lines may be installed without making a request for a concession, when the interested party wishes. These concessions may be provisional (in order to study projects) or definitive. A definitive concession is granted by a supreme decree issued by the Ministry of the Economy, by order of the President of the Republic. Permits relating to electrical installations that do not require concessions are granted by the corresponding Municipal Governments.

For further information and analysis on the aforementioned regulations, with regard to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see **Sections 3.1.6 and 3.1.7 of Chapter 3 of the EIS**, where more detailed versions of this information can be found.

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3**, and **Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neopteris curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Liolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed

will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor.

(see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

TUR Tourism

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.01 River sports

During the operations phase, the activities of the PHAM shall not directly or indirectly interfere with tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. Furthermore, the PHAM shall have no significant effect on boating activities on the Maipo River as a result of reductions in river flow rate; an analysis is presented in Annex 17 of the Addendum modeling a number of hydrological scenarios (1), concluding that the PHAM shall not affect the current situation in rafting and kayaking activities conducted in the area between San Gabriel and San José de Maipo.

In order to establish an analysis comparing the current Maipo River boating situation with predictions for the situation with the Project operational, the variables of flow rate, river width, and water depth were modeled, as valid indices to establish conditions for boating activities on the Maipo River.

This analysis showed that the Project shall not interfere with tourism activities conducted on the Maipo River, in view of estimates that in a dry year, the magnitude of variations in flow rate and water depth will not cause interference with boating activities.

For more information, see **Annex 17 of Addendum 1**.

- (1) The hydrological analysis used to evaluate reductions in flow rate is based on a statistical record going back 50 years, thus ensuring that seasonal and annual variations are incorporated into the analyses conducted.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the

possibility of improving tourism infrastructure, such as hiking trails,
mountain refuges, signage, etc.

TUR.03 Visual impact

The Project Owner has conducted a study to characterize the landscape of the area in which

the Project is to be located, taking into account esthetic and perceptual considerations and emphasizing the characterization and appraisal of the issues of visibility, quality, and visual fragility of the landscape.

In terms of Landscape Alteration or Landscape Impact associated with this infrastructure project, potential effects are classified as either limited duration - generally applying during the construction phase - or permanent, for effects that shall persist during the operations phase and continue throughout the working life of the Project. A qualitative methodology is used to study these effects, whereby the first phase consists of identifying sources of visual impact, and the second phase relates to identifying and classifying environmental impacts.

As a general rule, it is assumed that impact on the landscape during the construction phase shall be temporary, mainly due to the transitory nature of the sources of impact, the low level of prior human activity in certain areas, and the relatively low level of physical and visual accessibility of a significant proportion of the area subject to intervention.

As most of the Project construction works will be situated underground, during the operations phase the main visual signatures of its existence will be the intakes and access roads.

For further information on the methodology used for landscape impact assessment, see **Chapter 6, Section 6.1.4.10 of the EIS, and Annex 17 of Addendum 1.**

Remark N° 122 Difference of US\$100,000,000

If the Project has reduced its area of influence, why have the costs risen by US\$ 100,000,000 (one hundred million dollars) over and above the costing for the original project? This is a very large difference to be an error in calculation, and therefore **I want to know what this money will be used for, and who will receive this money?** As, during the citizen participation process, the company stated that everything about this project is transparent, please provide transparency regarding the money that the project is donating and giving away, and which funds belong to the project itself

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term

mutually beneficial relationships between the project and its surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

Remark N° 123 Saving Us from an Energy Crisis

In its arguments in favor, the company indicates that it intends for this project to save the country from an energy crisis. My question is: **does the company really believe that it will be able to save the country from an energy crisis with this project, as it indicated in its meeting with local residents? Or is it only saying this so that people see a solution to this problem, and finally choose to support the project, even though the statements made at the meetings with citizens will not be proved true? Will it or will it not save the country? Please do not reply that it is just a contribution; answer yes or no.**

Thematic responses

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

Remark N° 124 Landscape Change and Change in Water Composition

Does the company really believe that, by taking water from the Upper Maipo River, allowing only fine sediment to pass, and discarding coarser material into the natural watercourse, it will not change the scenery of the Upper Maipo River - once the river is left without the capacity to transport this sediment, rather allowing it to build up over the years? And the composition of the water?

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum.**

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

Remark N° 125 Drinking Water in San Alfonso and at Other Sites

Can the company Gener offer assurances that it will not affect the wells that supply drinking water to the town of San Alfonso when part of the river dries out, or other wells in the area, through effects on groundwater?

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in
**Chapter 2 of the
EIS.**

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.03 Underground water

Underground water will not be affected in any way by the operation of the Project. This is the case because the underground water flow capacity in each sector of the aquifer associated with the Maipo River is much lower than the minimum flow running through each section of the river, and therefore under all circumstances the aquifers shall remain saturated. Thus, underground water sources present in the area shall also not be affected.

The PHAM plans to construct 70 km of tunnels, of which approximately 50 km correspond to headworks or hydraulic pressure tunnels, the remainder being access tunnels for use during construction of the project and for subsequent operation of the power plants (see **EIS Chapter 5, Section 5.3.5.3**).

Most of these tunnels have been designed to operate at variable internal pressures, with a maximum achieved at certain points of a little more than 450 m. The design requirement for these tunnels is that the lower limit of principal compression in the surrounding rock medium is always less than the operating pressure, such as to maintain a sufficient safety margin to prevent alterations in natural permeability dynamics through hydrojacking. In areas where this design principle is not guaranteed, the Project plans to install impermeable tunnel linings (**EIS, Annex 45.4**).

During the excavation of these tunnels, it is possible that the work front may have to pass through permeable rock strata - leading to seepages of water into the tunnel, the magnitude of which will depend on the permeability of the rock, the depth of the tunnel, and the level of the water table. In some areas, tunnel wall treatments may have to be applied in order to prevent water transfer into or out of the headworks tunnels.

The Project does not plan to make use of any water seepages that may arise, in the generation of electricity. Additionally, the overarching design principles underpinning the Project are oriented towards limiting seepages during construction, in order to establish suitable conditions for efficient tunnel excavation activities. The same principle applies to methods to limit the infiltration of water from the tunnels into the rock mass, thus avoiding water loss during operations.

Additionally, these procedures guarantee that any groundwater that may intercept the tunnels

shall suffer no change in its natural hydrological dynamics, or impact on any

foreign components or water other than the water entering the system (**EIS, Annex 45**). Special attention will be paid to the quality and characteristics of any water that may eventually return to the natural water system through the tunnel access windows, and therefore construction contracts will specify measurements that must be made and the treatment that shall be required for subsequent disposal of such water, in order to ensure compliance with the quality requirements for water discharge into natural watercourses, under regulations currently in force.

In the event of seepages of water at high temperature and possible acidic composition, it is important to make clear that in general there shall be no major differences in the methods used to render the tunnel walls impermeable. During all site surveys conducted, research boreholes and surface geological maps produced to date applying to the areas through which the tunnels will pass, no evidence whatsoever has been found to lead to any prediction of the presence of water at high temperatures, or with mineral or acidic contamination. As additional background information, during the construction of the Alfalfal Plant - with the excavation of 35 km of tunnels - no events similar to those indicated above occurred. Notwithstanding the above, the specification establish that, in locations located close to potentially critical areas, the contractor must drill survey boreholes of between 25 m and 30 m in length ahead of the tunnel work front, in order to gain early warning of seepage problems and thus be able to apply impermeable tunnel wall treatments as required. See **EIS, Annex 45.4**.

Remark N° 126 Insurance

Will the company Gener contract the insurance policies that any project of this scale should hold, such as agricultural insurance, and policies covering all risks to local residents; or, what policies will be held?

Thematic responses

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly

frequented, minimizing their visual impact.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1)

Chapter 3 of the EIS provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

PRO.01.02 Insurance

Notwithstanding the fact that legislation in force does not impose an obligation on the Project Owner to contract insurance, it is the policy of the Risk Management Department of the Gener group to maintain civil responsibility insurance policies covering damages to third parties or injuries to its personnel and damage to its property, covering both the construction and operations phases of its Projects. Notwithstanding the above, in the event that activities related to the construction or operation of its installations for the PHAM Project cause harm to third parties, the liability and the amount awarded as compensation for damages suffered must be determined by the courts.

SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

SUE.03 Agriculture

It should be pointed out that the main irrigation channels fed from the Maipo River have their intakes located downstream of the La Sirena Channel intake, which itself is located approximately 1 km downstream of the Las Lajas Power Plant discharge spillway.

Only the Maurino and Manzano Channels have their intakes located on the Colorado River. In the case of the channels that draw water from the Colorado River, the Project Owner has agreed to construct such additional works as are required at the channel intakes, and to accept responsibility for maintaining these installations.

The Project shall have no effect on the availability of water resources used for irrigation, as the points where the PHAM will capture and discharge the water that it uses are all located upstream of the area in question.

Remark N° 127 Metropolitan Master Plan

Will the Project Owner comply with the Metropolitan Master Plan - yes or no?

Thematic responses

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly

frequented, minimizing their visual impact.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1)

Chapter 3 of the EIS provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

Remark N° 128
El Morado Natural Monument

Will the Project pass underneath the El Morado Natural Monument or any similar site - yes or no?

Thematic responses

**ARQ Archeological and
Paleontological Sites: Heritage**

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

PRO.03.02 Tunnels

The majority of the Project is planned for installation underground. The general characteristics of the tunnels are described in Chapter 2 of the EIS, Table 2.2.5 (for detailed geological information on the path taken by the tunnels, see Annex 46 of the EIS).

For an evaluation of the impact and environmental management measures associated with underground installations, see Chapter 6 of the EIS.

Annex 45 of the EIS, Hydro-Geology of Underground Works, presents a general description of the geological conditions that are expected to be found along the lengths of the tunnels; expected permeability based on geological knowledge and hydro-geological conditions in the area, incorporating experience gained during the construction of tunnels for the Alfalfal Plant, which has been operative for more than 17 years; as well as a description that includes the design of the tunnels, providing a brief explanation of the methods to be used to reduce and control water seepage.

With regard to the impact of the path taken by the tunnel passing underneath the El Morado Natural Monument, and measures to be taken to respect the area, see Section I, Responses 4, 5, and 6, in the Addendum.

Remark N° 129 Installed Power

Please state what will be the real power generated by the project. Also, state whether charges will be levied for installed power capacity. Given that in this case there is a great difference between the power generating potential of the Project's hydrological characteristics and the power capacity being installed, what is the reason for the magnitude of this difference, if sufficient water resources are not available?

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS**.

This section presents information characterizing the basins and tributaries of the Volcán, Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex 13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS**.

ELE Electrical Installations

The electrical installations presented in the EIS comprise the substation, to be located in the El Sauce area, the characteristics of which are to be found in **Annex 27 of the EIS**; given that the electricity transport layout (cabling and towers) is to be presented to the Environmental Impact Assessment System once all background information is available.

ELE.03 Transmission lines

In view of the project's location, close to Santiago, it is expected that the distance covered by the definitive cabling layout will be short, involving a minimum of sectors not subject to prior intervention. With regard to the specific location of the cabling layout, plans call for the use of the existing high tension power line used by the Queltehues, Volcán, and Maitenes Plants.

Once the layout of the high tension power line has been defined, the Project Owner will submit this plan to the Environmental Impact Assessment System, in accordance with legislation in force. In line with the development of the Compliance Plan for environmental legislation applicable to the Project, the General Regulations applicable in this instance are indicated below:

Decree with Force of Law N°4, dated 05 February, 2007, setting forth the Recast, Coordinated, and Systematized Text of the General Law on Electrical Services.

The General Law on Electrical Services governs the generation, transmission, distribution, and regimen of concessions and tariffs applicable to electrical energy, and the functions of the State with regard to these areas.

Supreme Decree N° 327, Regulations Regarding the General Law on Electrical

The Regulations Regarding the General Law on Electrical Services establish, in their 8th Article, that hydroelectric power plants, electrical substations, and transmission lines may be installed without making a request for a concession, when the interested party wishes. These concessions may be provisional (in order to study projects) or definitive. A definitive concession is granted by a supreme decree issued by the Ministry of the Economy, by order of the President of the Republic. Permits relating to electrical installations that do not require concessions are granted by the corresponding Municipal Governments.

For further information and analysis on the aforementioned regulations, with regard to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see **Sections 3.1.6 and 3.1.7 of Chapter 3 of the EIS**, where more detailed versions of this information can be found.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

Remark N° 131 Improper Legal Framework

How is the future of the PHAM predicted for the next 50 years, within the current legal framework for energy?

Thematic responses

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

Remark N° 132 Improper Legal Framework

How will the PHAM continue to maintain dialog with the community, with no legal framework?

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes

Maitenes Foundation agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

Remark N° 133 Project Incomplete

Transmission

Thematic responses

ELE Electrical Installations

The electrical installations presented in the EIS comprise the substation, to be located in the El Sauce area, the characteristics of which are to be found in **Annex 27 of the EIS**; given that the electricity transport layout (cabling and towers) is to be presented to the Environmental Impact Assessment System once all background information is available.

ELE.03 Transmission lines

In view of the project's location, close to Santiago, it is expected that the distance covered by the definitive cabling layout will be short, involving a minimum of sectors not subject to prior intervention. With regard to the specific location of the cabling layout, plans call for the use of the existing high tension power line used by the Queltehues, Volcán, and Maitenes Plants.

Once the layout of the high tension power line has been defined, the Project Owner will submit this plan to the Environmental Impact Assessment System, in accordance with legislation in force. In line with the development of the Compliance Plan for environmental legislation applicable to the Project, the General Regulations applicable in this instance are indicated below:

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For further information and analysis on the aforementioned regulations, with regard to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see **Sections 3.1.6 and 3.1.7 of Chapter 3 of the EIS**, where more detailed versions of this information can be found.

Remark N° 134 Local Improvements

Creation of a foundation to continue the relationship between the community and the PHAM.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

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The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
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The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes

Maitenes Foundation agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

Remark N° 135 **Regional and Provincial Situation**

The position of the State regarding the role of the Project as part of the general perspective.

Thematic responses

OTR Other

This section relates to certain special situations that could not be categorized, or that are linked to specific requests, disqualifications, or situations that feature a clear political component, against either the environmental authority or the Project Owner.

OTR.02 CONAMA

Remark N° 136 Technological Changes

Of the lungs of the City

- The Project accepts (assumes) that technology will not change.

Thematic responses

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

SLD Health Impact

The Project owner shall take responsibility for ensuring compliance with health and safety regulations, in order to prevent any possible risk to health and physical integrity for the inhabitants of San José Maipo as well as the persons working on the Project.

SLD.02 Atmospheric

Although the Project involves surface construction activities, which will lead to the emission of particulate matter, plans call for the implementation of a suite of mitigation measures that will result in a considerable reduction in emission, not only of the PHAM itself but also as against the baseline of current particulate emissions through the Project's area of influence. In addition to the above, these considerations should be evaluated bearing in mind the fact that most of the Project's works will be underground, not producing any emissions of particulate matter.

Conversely, given that most of the Project's works are to be located in high mountain areas, it can be stated that the prevailing ventilation conditions in this environment will facilitate the dispersion of dust, with a natural reduction in emissions during the winter season as a result of the additional moisture contributed by rain and snow precipitation.

For more information on emissions compensation measures, see **Annex 5 of the EIS**.

Remark N° 137

Guarantees

- Environmentalists state that this project will cause an environmental catastrophe
- The company AES Gener states that the impacts will be minimal

The question is as follows: does a baseline study exist in the EIS that presents a snapshot of the ecological and environmental situation (biomass, wildlife, relative humidity, etc.)?

If the "environmentalists" are right, what measures will be taken to "guarantee" continuity as against the baseline, with regard to our ecology and environment?

1. Quantity and quality of plant life
2. Quantity and quality of wildlife
3. Relative humidity characteristics

We are not "fortune tellers", projecting the project's "real" environmental impacts is not an exact science. Let's guarantee the District's environmental future.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.04.04 Monitoring and control of flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
Alto Volcán	Stream gauge station	406,157	6,259,100
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán		
Alto Volcán	Control Station	407,468	6,259,751
	La Engorda Intake		

Alto Volcán	Control Station Las Placas Intake	406,780	6,260,782
Alto Volcán	Control Station Colina Intake	407,181	6,260,081

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Alto Volcán	Control Station El Morado Intake	405,768	6,261,231
Yeso River	Rain gauge station PBN (15)	391,504	6,262,449
Yeso River	Control Station El Yeso Intake	399,666	6,272,077
Colorado River	Stream gauge station El Sauce	380,449	6,287,261
Colorado River	Intake control station Colorado River	389,063	6,292,501

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

F&F Biodiversity Impact Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempe Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neoporteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Lilolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals

will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).
No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

Remark N° 138

5% of the PHAM Project's earnings must be given to the District.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes

Maitenes Foundation agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

Remark N° 139 Reduction in Water Flow Rates

As I own land alongside the Colorado River, I need water to maintain environmental moisture.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in
**Chapter 2 of the
EIS.**

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

Remark N° 140 Tourism

Tourism demand, in qualitative and quantitative terms

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism

is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **TUR Tourism**

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.01 River sports

During the operations phase, the activities of the PHAM shall not directly or indirectly interfere with tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. Furthermore, the PHAM shall have no significant effect on boating activities on the Maipo River as a result of reductions in river flow rate; an analysis is presented in Annex 17 of the Addendum modeling a number of hydrological scenarios (1), concluding that the PHAM shall not affect the current situation in

rafting and kayaking activities conducted in the area between San Gabriel and San José de Maipo.

In order to establish an analysis comparing the current Maipo River boating situation with predictions for the situation with the Project operational, the variables of flow rate, river width, and water depth were modeled, as valid indices to establish conditions for boating activities on the Maipo River.

This analysis showed that the Project shall not interfere with tourism activities conducted on the Maipo River, in view of estimates that in a dry year, the magnitude of variations in flow rate and water depth will not cause interference with boating activities.

For more information, see **Annex 17 of Addendum 1**.

- (1) The hydrological analysis used to evaluate reductions in flow rate is based on a statistical record going back 50 years, thus ensuring that seasonal and annual variations are incorporated into the analyses conducted.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 141 Water Rights

Respect third party water rights, and ensure that the holders of such rights are respected in the long term.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services. For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4 in Chapter 2 of the EIS.**

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been

conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape. To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a

description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	406,157		
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 142**Irrigation** **User**
Communities

El Manzano Channel and

Maurino Channel

Thematic responses

Specific Response

The Project Owner reiterates its commitment to ensuring that necessary infrastructure exists in the river to permit water to enter the channels at all times, in accordance with the rights granted and the availability of the river throughout the life of the PHAM project.

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water**rights**

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in
Chapter 2 of the
EIS.

AGU.02.01**Irrigation**

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources.

During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 **"Hanging"**
channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds,

Remarks and Responses

Remark N° 142 Page 2

shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

Remark N° 143 Hands Off the Colorado River

Robber barons, you don't mess with water, the natural world will make you pay for your impudence

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS**.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in
**Chapter 2 of the
EIS**.

Remark N° 144 Water

The drying out of rivers and streams will certainly cause an impact on the environment and on families.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures

designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc. Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

Remark N° 145 Glacier and Natural Monuments

The damage caused in these areas will have disastrous consequences for tourism and on local residents.

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly

agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **TUR Tourism**

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 146 Job Creation

Supposed job creation effects are not a reality that will have any effect on the local population and community in the areas affected.

Thematic responses

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.01 Jobs in the District

Local labor availability is estimated based on figures from the Labor Brokerage and Information Office. This information will be made available to construction contractors so that they can preferentially hire local workers. According to information compiled at the Project Office in San José de Maipo, the project has registered a total of 980 potential project workers, of whom 390 are unemployed, broken down as follows:

Mine workers:	105
Carpenters, Builders, and Rebar Layers:	157
Heavy Machinery Operators:	131
Non-specialized day laborers:	39
Drivers:	87
Specialized technical personnel:	60
Welders:	26
Foremen and supervisors:	7
Graduate professionals:	20
Cleaning, security, and canteen workers:	120
Administrative personnel:	91
Other, misc.:	139

The average project workforce during the construction phase (5 years) is estimated at 2000 persons, and during the Citizen Participation process the company has agreed to ensure that an average of at least 500 local persons will be on the payroll during the construction of the Project.

Remark N° 147 Education

The Foundations as a consolation prize to the community to generate a favorable impression of the company.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

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Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of

the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

CAL.02 Education

A goal of the Maitenes Foundation relates to education for children and young people against the backdrop of the natural environment (for more information on the goals and achievements of the Foundation, see Annex 26 of the EIS).

Gener firmly believes that contributions to the technical and vocational education and training of young people must keep sight of real employment possibilities. Therefore, as a first initiative it has earmarked resources for an education improvement project in the district, which will contribute to establishing education management for the restructuring of the school curriculum and professional technical capacity building, taking into account the features needed to boost local employability. Based on information and recommendations from this study, Gener, acting through the Maitenes Foundation, will undertake a Capacity Building for Employability Program fundamentally oriented towards those whose family, social, or economic situation has barred them from completing their education and training, or acquiring the skills needed in order to find work.

Remark N° 148 Environmental Impact

The fact that a tunnel passes beneath a glacier leads to irreparable damage to the area's ecosystem. It is also harmful to tourism in the area.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

**CAL.04 Fostering tourism
in the area**

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **PRO The Project**

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

PRO.03.02 Tunnels

The majority of the Project is planned for installation underground. The general characteristics of the tunnels are described in Chapter 2 of the EIS, Table 2.2.5 (for detailed geological information on the path taken by the tunnels, see Annex 46 of the EIS).

For an evaluation of the impact and environmental management measures associated with underground installations, see Chapter 6 of the EIS.

Annex 45 of the EIS, Hydro-Geology of Underground Works, presents a general description of the geological conditions that are expected to be found along the lengths of the tunnels; expected permeability based on geological knowledge and hydro-geological conditions in the area, incorporating experience gained during the construction of tunnels for the Alfalfal Plant, which has been operative for more than 17 years; as well as a description that includes the design of the tunnels, providing a brief explanation of the methods to be used to reduce and control water seepage.

With regard to the impact of the path taken by the tunnel passing underneath the El Morado Natural Monument, and measures to be taken to respect the area, see Section I, Responses 4, 5, and 6, in the Addendum.

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits

to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 149 Water

The Project for the New Hydroelectric Plants will cause a noteworthy decline in the quantity of water available for use in irrigation.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in
**Chapter 2 of the
EIS.**

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El

Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and**

Section IV, Question 5.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 150 Employment

The Project offers no concrete guarantees that new jobs will be created for the people who live in the area.

Thematic responses

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.01 Jobs in the District

Local labor availability is estimated based on figures from the Labor Brokerage and Information Office. This information will be made available to construction contractors so that they can preferentially hire local workers. According to information compiled at the Project Office in San José de Maipo, the project has registered a total of 980 potential project workers, of whom 390 are unemployed, broken down as follows:

Mine workers:	105
Carpenters, Builders, and Rebar Layers:	157
Heavy Machinery Operators:	131
Non-specialized day laborers:	39
Drivers:	87
Specialized technical personnel:	60
Welders:	26
Foremen and supervisors:	7
Graduate professionals:	20
Cleaning, security, and canteen workers:	120
Administrative personnel:	91
Other, misc.:	139

The average project workforce during the construction phase (5 years) is estimated at 2000 persons, and during the Citizen Participation process the company has agreed to ensure that an average of at least 500 local persons will be on the payroll during the construction of the Project.

Remark N° 151 Ecological flow rates

The ecological flow rates should be defined by the DGA, not by the Project Owner.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river

flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero

(0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 153 Decline in Flow Rates

The impact to arise as a result of the decline in flow rates in the watercourses subject to intervention is not a cosmetic effect that is justified through the absence of tourism-related infrastructure.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at

least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Q_e) approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently

subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

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The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Northing	Easting
	Alto Volcán	406,157	6,259,100
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 156
Impact in Watercourses Subject to Intervention

Increase in temperature from sunlight and other factors

Thematic responses

Specific response

The watercourses subject to intervention are not susceptible to significant impact regarding sunlight or increases in temperatures.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

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For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.04 Monitoring and control of flow rates and water levels

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Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

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Yeso River	El Morado Intake Rain gauge station PBN (15)	391,504	6,262,449
Yeso River	Control Station El Yeso Intake	399,666	6,272,077
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Colorado River	Intake control station Colorado River	389,063	6,292,501

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 157 Tourism

Given that the Cajón del Maipo valley has been declared a zone of national tourism interest, the Project Owner is requested to analyze and evaluate to what extent the impacts to be generated by the PHAM are compatible with this role.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents. TUR Tourism Scenery**

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 158 Water

To dry out rivers is to leave the community without its main source of life.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that

will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a

description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 159 Education

The proposals do not always provide responses to the people's real education needs, by means of the foundations.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of

the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

CAL.02 Education

A goal of the Maitenes Foundation relates to education for children and young people against the backdrop of the natural environment (for more information on the goals and achievements of the Foundation, see Annex 26 of the EIS).

Gener firmly believes that contributions to the technical and vocational education and training of young people must keep sight of real employment possibilities. Therefore, as a first initiative it has earmarked resources for an education improvement project in the district, which will contribute to establishing education management for the restructuring of the school curriculum and professional technical capacity building, taking into account the features needed to boost local employability. Based on information and recommendations from this study, Gener, acting through the Maitenes Foundation, will undertake a Capacity Building for Employability Program fundamentally oriented towards those whose family, social, or economic situation has barred them from completing their education and training, or acquiring the skills needed in order to find work.

Remark N° 160
Environment of Natural Monuments

Environmental impact, affecting tourism, on natural reserves.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

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CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism

is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents. F&F Biodiversity Impact**

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neoporteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Liolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopus cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

TUR Tourism

Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21 and Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-

term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives

coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

**Remark N° 161
Employment**

Employment proposals and offers often lack necessary physical conditions, or are not in the interests of the community.

Thematic responses

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district. In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district. During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.01 Jobs in the District

Local labor availability is estimated based on figures from the Labor Brokerage and Information Office. This information will be made available to construction contractors so that they can preferentially hire local workers. According to information compiled at the Project Office in San José de Maipo, the project has registered a total of 980 potential project workers, of whom 390 are unemployed, broken down as follows:

Mine workers:	105
Carpenters, Builders, and Rebar Layers:	157
Heavy Machinery Operators:	131
Non-specialized day laborers:	39
Drivers:	87
Specialized technical personnel:	60
Welders:	26
Foremen and supervisors:	7
Graduate professionals:	20
Cleaning, security, and canteen workers:	120
Administrative personnel:	91
Other, misc.:	139

The average project workforce during the construction phase (5 years) is estimated at 2000 persons, and during the Citizen Participation process the company has agreed to ensure that an average of at least 500 local persons will be on the payroll during the construction of the Project.

SOC.01.02 Working conditions

To date no schedule exists specifying labor requirements for the full duration of the construction phase. Detailed information specifying jobs created under average and peak labor requirements, broken down by labor requirement dynamics for each encampment, will only be available once the Project Owner has tendered the works contracts.

During the operations phase, it is expected that personnel requirements will amount to approximately 80 positions available, required for power plant operations and maintenance activities. Unlike work positions created during the construction phase, the jobs created in the operations phase will be permanent (EIS, Chapter 6, Section 6.4.2.4).

The Project Owner will provide for coordination between the construction works contractors, the Labor Brokerage Office, and the Municipality of San José de Maipo, regarding local labor required and jobs sought. The PHAM has accepted a commitment to incentivize works contractors to prioritize local contracting of labor required.

No prior training is planned in advance of the Construction Phase. However, such training will form part of the programs implemented in the more advanced phases of the project.

Remark N° 162

Role of CONAMA and/or COREMA

Caring for the environment is the priority role of CONAMA, and this body therefore cannot approve the Project if it is unsafe, and given that the environment law does not specify reasonable limits on the usage of water (as shown by the ridiculous ecological flow rate proposed by AES Gener)(Why does the company establish the ecological limit)(and not you).

Thus, if CONAMA does not want to condemn the valley and its residents to misery, it must oppose the Project or impose LIMITS and CONDITIONS.

1. that the company must cede 5% of its profits to the Cajón del Maipo Valley, for social uses.
2. that it must occupy no more than 60% of river and stream flow rates in order not to cause environmental impacts.
3. that it must not prevent persons from entering high mountain areas (c.f. the case of Alfalfal I).

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

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In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

OTR Other

Remarks and Responses

Remark N° 162 Page 3

This section relates to certain special situations that could not be categorized, or that are linked to specific requests, disqualifications, or situations that feature a clear political component, against either the environmental authority or the Project Owner.

OTR.02 **CONAMA**

Remark N° 164
Irrigation User Organizations, El Manzano Channel and Maurino Channel

In view of the drop in water flow in the Colorado River, irrigation user organizations will find it impossible to abstract the quantities of water to which they have rights.

1. The Project Owner should include the construction of such installations as shall be necessary to avoid this impact, and the commitment that has been expressed to defray all costs arising through the construction and maintenance of these installations.
2. The Project should include guarantees and compensation payable in the event that these organizations are rendered unable to abstract the water to which they hold rights.
3. The Project Owner should attach written consent by the “El Manzano Channel” and “Maurino Channel”

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project’s base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project’s EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project’s area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see **Table 2.3.4** in **Chapter 2 of the EIS**.

AGU.02.01
Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project’s area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 **“Hanging”**
channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

PRO.01.01 Compensation

The concept of compensation refers to the act of indemnifying damages or harm caused. Within the framework of the EIS, the Project Owner has issued a proposal to the competent authority regarding a suite of environmental management measures aiming to minimize, compensate, and restore the Project's impacts, making their implementation sustainable (Chapter 6 of the EIS).

In this regard, compensation is understood to be included in the spirit or end goal of the environmental management measures proposed by the Project Owner, following the evaluation of the direct and indirect effects of the PHAM on each of the environmental components stipulated in Supreme Decree 95, SEIA Regulations.

Remark N° 169

Precautionary Measures to Maintain Ecological Flow Rates

- * Precautionary measures should be indicated that will be taken to ensure the maintenance of ecological flow rates along all applicable watercourses and throughout the year.
- * The Project Owner should take into account variables arising as a result of the formation of flat, open watercourses at a level closer to the surface. Temperature increased from sunlight, loss of water through evaporation, and the process of eutrophication can arise as a result of these conditions.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4 in Chapter 2 of the EIS**.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known

as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow

velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	Rain gauge station		
	406,157		
	Stream gauge station		
	6,259,100		
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 171 Morales Stream - Maipo Valley Property

With regard to the Environmental Impact Study for the project "PROYECTO HIDROELÉCTRICO ALTO MAIPO file N° 105", presented by AES Gener S.A. to the environmental impact assessment system (SEIA), in conformity with the General Base Law on the Environment, Law 19,300 dated 1994, in representation of the owners of the property at Quebrada Morales, over the surface and underground properties of which a significant part of the project will pass; we wish to express:

The PHAM will install the new "Alfalfal II" power plant in the upper reaches of the Maipo River and shall make use of water from the upper reaches of the Volcán River and the Yeso River.

Most of the Project's installations shall be located underground, including the turbine rooms and headworks, as indicated in Project documentation, but the fact that the works are underground does not mean that they may not create prior impacts and destruction of surface land to which the Project has access.

The Project's access roads and water intakes constitute its main surface works and installations. Plans also call for the creation of a **Muck Disposal Heap** that will receive all material produced through the excavation of this tunnel.

The construction of the Alfalfal II Plant water discharge spillway implies the installation of the **Muck Disposal Heap** containing materials removed in the creation of this installation, and the installation of temporary or permanent encampments, as well as movement of persons or goods for a sufficient time to bring about the destruction of the area of great archeological and paleontological interest known as "EL VALLE DE LAS ARENAS", which forms part of the Quebrada Morales land holding owned by Messrs. Von Plate Harries.

This area known as the "**Valle Las Arenas**" is included in the National System of Protected Private Wilderness Areas (SNAPP), which is legally protected under Law 19,300.

Law 19,300 defines environmental damage as "any significant loss, decline, detriment, or harm caused to the environment, or to one or more of its components"

The term "environment" is understood to refer not only to natural elements but also to artificial and socio-cultural elements; Article 10 part p) requires the application of the environmental impact evaluation system to a number of classes of project, including the implementation of any works in any area placed under official protection, such as archeological and paleontological remains that, as a result of their characteristics, are protected under the National Monuments Law.

Under Chilean legislation, in the absence of a soil law or land law, and in view of the precarious treatment of cultural and scenic heritage provided under the General Urban Development and Construction Law, the environmental impact evaluation system takes on a role as a vital legal instrument that, operating under the precautionary principle, permits the reconciliation of due protection for goods belonging to cultural heritage and the execution of projects or activities that may form sources of environmental impact, with the aim of ensuring that irreplaceable sites such as those with anthropological, archeological, historic, and other classes of value causes them to be classed as natural and cultural heritage are granted special consideration in the evaluation that must be conducted for the project.

The El Alfalfal II Project, with its works located within the "**Valle Las Arenas**" area, and particularly the siting of the Muck Disposal Heap and the installation of an encampment with consequent movements of persons and vehicles, nonetheless plans for no measure to protect or prevent damage to the natural and archeological riches located at that site.

On the contrary, the project documentation refrains from making any mention of the "Valle Las Arenas" area. It does not indicate that these works will form the start of a process of irreparable damage, which will cause the archeological, paleontological, and natural sites such as wetlands, all located on the mountain pass to the "**El Morado Glacier**", shall no longer possess their original scientific and natural potential. Similarly, in the project documentation no protection or damage prevention measures have been presented for this important area, which rather contains incomplete background information that fails to specify such basic figures as the quantity of muck, in tons or cubic meters, derived from the construction of the tunnel and to be disposed of at the Muck Disposal Heap to be installed in that valley.

"**Valle de Las Arenas**" is recognized by the global scientific community, and certain members of this community have expressed their concern over the international installation, some of whom have expressed their concern over the installation of this project in that valley, with regard to which we refer to the report by geologist Christian Salazar Soto and Professor Doctor Wolfgang Stinnesbeck, a geologist and paleontologist, both members of the University of Heidelberg, Germany, in the *Informe de la Sociedad de Paleontología de Chile* as well as the municipal government of San José de Maipo - all of which publication warn of severe environmental damage to the area, and to which we claim a link as owners of the aforementioned land holding.

It has been the intention of the landowners to incorporate the "**Valles Las Arenas**" into protected national heritage in view of its enormous tourism potential, and its unique and irreplaceable archeological and paleontological remains. For this reason work has been conducted on this "**Private Protected Wilderness Area**" under the legal protection granted to private interests promoting the development of such areas for the development of sustainable projects, which, maintaining protection of their unique properties, can be the subject of top level tourism projects that bring great economic benefits to the area.

Any person interested in the "**VALLE LAS ARENAS**" can view its website: www.vallelasarenas.cl which provides all necessary information on its content and significance.

Finally, it is requested that all necessary reports relating to the temporary and permanent occupation of the Valle Las Arenas be requested, relating to the construction of the project, and providing detailed and precise specification of the area and volume of the muck disposal heap that shall remain permanently in this region; and furthermore, that an opinion be issued with regard to the mechanisms to be applied to the protection of existing wetlands and fossils in that area.

In view of the above, attention is hereby called to the destruction represented by works to be

conducted in the "Valle Las Arenas" in its role as a "**Private Protected Wilderness Area**", as well as the irreparable environmental risks to be visited upon the area, which will result in any

other environmental or tourism project in the area becoming unfeasible, thus impeding the successful completion of sustainable projects that respect the environment.

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

AGU.01 Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum 1**.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material
- b) creation of a viewpoint
- c) fossil trail

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

ARQ.03 Scientific research

The scientific and cultural importance of the paleontological resources present has been recognized by the PHAM project principal, leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the project principal has taken on a commitment to enhance knowledge of the area before starting planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may be detected during the course of construction under the PHAM. These activities will contribute not only to the maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of

materials or components present.

For more information, see **Annex 14 of Addendum 1**.

MAR Muck

The PHAM plans to construct approximately 70 km of tunnels. The excavation of these tunnels will generate inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of inert material produced in road building and the construction of buried conduits.

This muck material will be deposited in the 14 muck disposal heaps that the Project plans to create. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria. For more information, please see **Annex 6 of the EIS** and **Annex 3 of the Addendum**.

MAR.01 Regulations

The Project Owner has made available a Management Plan for "Project Muck Disposal Heaps", which contains information on the technical, environmental, and safety specifications of the heaps, as well as recommendations contained in the Ministry of Public Works' 2004 Environmental Management Plan Manual for Works Subject to Concessions. In particular, the Plan establishes the environmental considerations adopted for the operation of the muck disposal heaps, to be implemented during the construction of tunnels and roads under the PHAM.

In order to comply with the environmental management measures contained in the EIS, an Environmental Monitoring Program will be conducted, with the aim of verifying the effectiveness of these measures and compliance with them. For details on the principal actions included in the Monitoring Program, and for the various stages of functionality of the muck disposal sites, see **Annex 6 of the EIS** and **Annex 3 of Addendum 1**.

For more information on the specific regulations applicable to the Project, and compliance therewith, see **Chapter 3 of the EIS**.

MAR.02 Location

The PHAM calls for the creation of 14 muck disposal heaps, for the disposal of waste material from tunnel boring and smaller quantities of inert waste from the construction of roads and buried conduits. Maps of the muck disposal heaps, and a copy of the muck disposal heap management plan, are included in Annex 6 of the Project EIS.

For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria.

From a technical and safety perspective, the muck disposal heap sites have been located as close as possible to exit points from tunnels and to surface work sites, in areas not at risk to landslides or landslip events.

The following aspects have been taken into account as environmental criteria in site selection:

Sites have been selected that are distant from any settlements or any housing used on a permanent or temporary basis.

Priority has been given to selecting sites with low visual impact - that is, in areas that are distant from potential observation points on public highways or high ground.

In the Project area's higher elevation regions, the disposal heaps have been sited up against natural topological features, such that the emplacement of the heaps' layers forms a continuation of the general landform structures of the area.

In general these are areas that are of low value as a habitat for plant life (soils with usage capacity ratings V, VI, and VII), and efforts have been made to avoid modifications to the original land form structures present or to surface watercourses.

Surface surveys have been conducted in all of these regions, as details in **Section 5.8, in Chapter 5 of the EIS**, to rule out the presence of sites of archeological and/or paleontological value at the muck disposal heap sites.

For more information, see **Annex 6 of the EIS** and **Annex 3 of Addendum 1**.

Remark N° 172

2. Plan for Compliance with Applicable Environmental Legislation Environmental Regulations Legal Framework

According to Table 6 of the EIS

Table 6: Summary of Plan for Compliance with Applicable Environmental Legislation

Law 17,288

(Law 20,021)

Supreme

Decree 484

Cultural Heritage: The Project shall not affect the sites identified in the Baseline studies.

Nonetheless, as a protection measures the Project Owner shall contractually require that the works contractor implement the measures to prevent risks to archeological and paleontological heritage

- **The Chilean Paleontological Society (SPACH) states that a risk of impact on paleontological heritage sites exists.**

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

AGU.01 Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum 1**.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material
- b) creation of a viewpoint
- c) fossil trail

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

ARQ.03 Scientific research

the scientific and cultural importance of the paleontological resources present has been recognized by the PHAM Project Owner,

leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the Project Owner has taken on a commitment to enhance knowledge of the area before starting planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may be detected during the course of construction under the PHAM. These activities will contribute not only to the maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of materials or components present.

For more information, see **Annex 14** of **Addendum 1**.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

Remark N° 173

Baseline

V.6 Cultural Heritage

According to the text of the EIS

“Three areas within the Project’s area of direct influence are identified as featuring resources of cultural interest: Las Morrenas and Camino del Inka in the Lo Encañado Lake area, and the site known as Aucayes 1 in the Colorado River - Aucayes Stream area. The “Las Morrenas” site is currently in a good state of conservation, the “Camino del Inka” site exhibits significant impact arising as a result of the construction of a water conduit that is currently not in use, and meanwhile the Aucayes 1 exhibits no apparent human or natural impact. In the Alto Volcán area, sites have been detected that may contain very ancient fossils or paleontological material.. Much of this material has been removed by tourists and residents of local settlements (according to background information available to the SPACH) Works under the PHAM shall not lead to any direct intervention”.

- **The Chilean Paleontological Society states that no reference has been made to the issue of tourists and local residents in relation to paleontological heritage, in communications with the company AES Gener. Additionally, we wish to make it clear that works under the PHAM do lead to intervention affecting fossil evidence.**

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project’s area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project’s area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

ARQ.02 Values preservation

General paleontological protection measures:

i) **Restricted area applicable to contractor company employees**

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a “restricted zone” with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) **Delimitation of buffer zones**

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) **Contingency measures**

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project’s paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) **Compensation measures**

- a) **production of cultural information material**
- b) **creation of a viewpoint**
- c) **fossil trail**

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District’s high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plant (**EIS, Chapter 8**); together, these measures

are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **TUR Tourism Scenery**

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 174**5. Identification, Prediction, and Evaluation of Environmental Impacts and Risk Situations****Environmental Evaluation**

According to the table in the EIS

I. Table 7: Hierarchy of Environmental Impacts

Construction phase

Elements or variables:

Cultural Heritage

Impact:

Three areas with resources of archaeological interest and one area of paleontological interest have been identified within the Project's area of indirect influence. Continual on-site expert advisory services will be contracted to prevent or minimize impact

Classification

Negative; Low significance

- **SPACH remark. According to information available, the sites of paleontological interest will be located within the project's area of direct influence. To which site is reference made with regard to the area of indirect influence?**

Thematic responses**ARQ Archeological and Paleontological Sites: Heritage**

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

ARQ.01 Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
 - Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
 - Archeological recovery plan for any finds discovered during expert supervision.
 - Workforce training on the possible presence of archeological sites.
 - Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum**.
- 1.

Remark N° 175

Chapter 2. Project Description

2.3 Description of Project Phases

2.3.2 Construction Phase

2.3.2.4 Creation of Encampments and Works Installations

According to the text of the EIS

A. Siting criteria

"Finally, and in accordance with the baseline study, the sites defined for the installation of site facilities and encampments have been surveyed by specialists, and the results of these surveys have, on a preliminary basis, ruled out the presence of findings and sites with archaeological or historic value, or belonging to national cultural heritage, or plant species listed in any conservation category "

- **SPACH remark. According to paleontological information available, sites with heritage value exist in the areas defined for the installation of site facilities and encampments.**

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

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1.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material
- b) creation of a viewpoint
- c) fossil trail

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned

to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

PRO.03.03 Encampments and Works Installations

For details on the creation of encampments and works installations, please see Chapter 2, Section 2.3.2.4 in the EIS.

For information on PHAM encampment and work site approach routes, see EIS, Chapter 2, Table 2.1.2,

For information on regulations, see Chapter 3 of the EIS and Annex 33, General Operating Regulations for Encampments and Work Sites.

For information on the management of waste produced at work sites and encampments, see Annex 18 of the EIS, "Site Installation Waste Management Plan".

For information on the discharge of treated wastewater, see Response 26 in the Addendum. For information on human consumption of water at encampments and works installations, see Chapter 2, Section 2.3.2.4, parts b and i.

For an assessments of the impact of the creation of encampments and works installations, monitoring methods, and conditions, see Chapter 6 of the EIS.

Remark N° 176

2.3.2.6 Muck Disposal Heap Sites

According to the text of the EIS

A. Siting

"The following aspects have been taken into account as environmental criteria in site selection:

- Surface surveys have been conducted in all of these regions to rule out the presence of sites of archeological and/or paleontological value"

- **SPACH remark. According to information available, sites with paleontological value exist in the areas defined for the Alto Volcán muck disposal heap.**

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

MAR Muck

The PHAM plans to construct approximately 70 km of tunnels. The excavation of these tunnels will generate inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of inert material produced in road building and the construction of buried conduits.

This muck material will be deposited in the 14 muck disposal heaps that the Project plans to create. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria. For more information, please see **Annex 6 of the EIS** and **Annex 3 of the Addendum**.

MAR.02 Location

The PHAM calls for the creation of 14 muck disposal heaps, for the disposal of waste material from tunnel boring and smaller quantities of inert waste from the construction of roads and buried conduits. Maps of the muck disposal heaps, and a copy of the muck disposal heap management plan, are included in Annex 6 of the Project EIS. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria.

From a technical and safety perspective, the muck disposal heap sites have been located as close as possible to exit points from tunnels and to surface work sites, in areas not at risk to landslides or landslip events.

The following aspects have been taken into account as environmental criteria in site selection: Sites have been selected that are distant from any settlements or any housing used on a permanent or temporary basis.

Priority has been given to selecting sites with low visual impact - that is, in areas that are distant from potential observation points on public highways or high ground.

In the Project area's higher elevation regions, the disposal heaps have been sited up against natural topological features, such that the emplacement of the heaps' layers forms a continuation of the general landform structures of the area.

In general these are areas that are of low value as a habitat for plant life (soils with usage capacity ratings V, VI, and VII), and efforts have been made to avoid modifications to the original land form structures present or to surface watercourses.

Surface surveys have been conducted in all of these regions, as details in **Section 5.8, in Chapter 5 of the EIS**, to rule out the presence of sites of archeological and/or paleontological value at the muck disposal heap sites.

For more information, see **Annex 6 of the EIS** and **Annex 3 of Addendum 1**.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly

frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water

abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El

Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

Remark N° 177

Chapter 4. Relevance of the Environmental Impact Evaluation System (SEIA) and

Need to Conduct an Environmental Impact Study.

4.3 Analysis of Articles 5 to 11 of the SEIA Regulations.

4.3.6 Article 11

- SPACH remark.

Cases a) and b) show proximity, and furthermore, sites corresponding to paleontological heritage exist that shall be subject to direct intervention. In the Alto Volcán area, the Lo Valdés Formation will be affected by the construction of the El Volcán Tunnel, which passes through and destroys the formation. The same area features ichnites (fossilized vertebrate tracks) in blocks, belonging to the Rio Damas Formation, particularly in the Valle de las Arenas.

The SPACH has reported the presence of these sites, and has been vocal in communication with the Project Owner AES Gener in its assertions that the PHAM will cause direct intervention on paleontological heritage, which will be affected by surface and underground works, or works requiring excavation.

The SPACH expresses its concern, given that it is not in agreement with the conclusion reached by AES Gener in this regard, as paleontological heritage will be subject to significant intervention under the PHAM.

Thematic responses

ARQ Archeological and Paleontological Heritage Sites:

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

ARQ.01 Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum 1**.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material
- b) creation of a viewpoint

c) fossil trail

For more information and details on the preservation of heritage value and

paleontological resources, please see **Annex 14 of Addendum 1**.

OTR Other

This section relates to certain special situations that could not be categorized, or that are linked to specific requests, disqualifications, or situations that feature a clear political component, against either the environmental authority or the Project Owner.

PRO.02 EIS Additional and Complementary Information

In accordance with consultation procedures conducted by oversight services, further studies and information have been incorporated into Addendum 1, which complements existing information provided in the EIS. Regarding ecological flow rates (**Annex 17**), cultural heritage (**Annex 14**) and the management of summer grazing areas (**Annex 6**).

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

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Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

PRO.03.02 Tunnels

The majority of the Project is planned for installation underground. The general characteristics of the tunnels are described in Chapter 2 of the EIS, Table 2.2.5 (for detailed geological information on the path taken by the tunnels, see Annex 46 of the EIS).

For an evaluation of the impact and environmental management measures associated with underground installations, see Chapter 6 of the EIS.

Annex 45 of the EIS, Hydro-Geology of Underground Works, presents a general description of the geological conditions that are expected to be found along the lengths of the tunnels; expected permeability based on geological knowledge and hydro-geological conditions in the area, incorporating experience gained during the construction of tunnels for the Alfalfal Plant, which has been operative for more than 17 years; as well as a description that includes the design of the tunnels, providing a brief explanation of the methods to be used to reduce and control water seepage.

With regard to the impact of the path taken by the tunnel passing underneath the El Morado Natural Monument, and measures to be taken to respect the area, see Section I, Responses 4, 5, and 6, in the Addendum.

Remark N° 178
Chapter V. Baseline
5.6 Existing Buildings
5.6.2 Economic and Production Activities
5.6.2.4 Tourism Sector
D. El Volcán, Baños Morales, and Lo Valdés
area. I. Current Tourism Activities
Rock hunting and archeological research

- SPACH remark. This point mentions the sale of fossils as an activity related to tourism, although this activity is illegal.

Thematic responses

**ARQ Archeological and
Paleontological Sites: Heritage**

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

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For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material
- b) creation of a viewpoint
- c) fossil trail

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plant (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual

conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **TUR Tourism Scenery**

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-

related traffic flow during

weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 179

5.8 Cultural Heritage, Paleontological Resources; Background Information on the Study Area

The Chilean Paleontological Society addressed letters to the CMN, Cordillera Provincial Government, CONAMA, Municipal Government of San José de Maipo, and AES Gener, expressing its concern regarding damage that will be caused to paleontological heritage in the Alto Volcán area, stating that damage will be caused to geological units such as the Lo Valdés, Colimapu, and Rio Damas formations, which have shown evidence of fossils. Attached to these letters, it included the **“Preliminary Report on Material of Paleontological Interest in the Alto Río Volcán Area”**, prepared by Dr. Karen Moreno, regarding the ichnites (fossilized vertebrate tracks) in blocks, belonging to the Rio Damas Formation, located in the Valle de las Arenas. In view of existing knowledge regarding the area to be subject to intervention under the PHAM, the SPACH indicates that direct intervention affecting paleontological heritage will indeed occur.

5.8.5 Conclusions

SPACH expresses the conclusion that it is not in agreement with the presence of paleontological resources, as direct intervention affecting these resources clearly does exist. It is necessary to conduct a paleontological survey, research activities, and subsequent monitoring of waste rock if the PHAM goes ahead, which activities should be conducted by qualified professionals.

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project’s area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project’s area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
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For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a “restricted zone” with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project’s paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material
- b) creation of a viewpoint
- c) fossil trail

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

ARQ.03 Scientific research

The scientific and cultural importance of the paleontological resources present has been recognized by the PHAM project principal, leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the project principal has taken on a commitment to enhance knowledge of the area before starting planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may be detected during the course of construction under the PHAM. These activities will contribute not only to the maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country’s non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects

of this project, particularly where justified by the heritage significance of materials or components present.
For more information, see **Annex 14** of **Addendum 1**.

Remark N° 180

Chapter 6. Impact Evaluation and Environmental Management Measures

6.4 Impact Evaluation and Environmental Management Measures

6.4.1 Construction Phase

6.4.1.9 Interference with Tourism Activities

I) Identification and Sources of Impact

- Alto Volcán Sector

- SPACH remark. Contrary to statements made by AES Gener in its EIS, at this point it is indeed our belief that sites of paleontological cultural interest will be affected.

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

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PRO The Project

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The advantage of this project is that most construction work will be

implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

PRO.03.01 Intakes

The Alto Maipo Hydroelectric Project (PHAM) plans to capture water resources at eight different points. The Project holds in-stream water rights at each of these points, and the concessions granting rights at most of these points include ecological flow rate stipulations issued by the Directorate General of Water (DGA).

The water intake points are as follows:

For the Alfalfal II Plant: the El Morado Stream, the La Engorda Stream, the Colina Stream, the Las Placas Creek, and the Yeso River. For the Las Lajas Plant: the Alfalfal Plant discharge, and the Colorado River at the Maitenes Intake. For a detailed description of planned installations, see Chapter 2, Section 2.2.2 of the EIS, and attached Annexes 1 and 8.

See Annex 12 of the EIS for a map of intakes in the PHAM area of influence. See Table 2.2.2, in Chapter 2 of the EIS, for the characteristics and descriptions of the intake installation.

For information on the Project's impact on water quality in the area's watercourses arising as a result of the construction of intakes, see Section I, Question 3 in the Addendum.

For the intake maintenance plan, the Chapter 2, Section 2.2.2 of the EIS, and additional information provided in Section I, Question 11 of the Addendum.

For clarifications regarding the El Yeso Reservoir, see Section I, question 27 in the Addendum.

For details on the construction methods and the mitigation and compensation measures planned by the Project to address the environmental impact of the intakes, see Annex 6 of the Addendum.

PRO.03.02 Tunnels

The majority of the Project is planned for installation underground. The general characteristics of the tunnels are described in Chapter 2 of the EIS, Table 2.2.5 (for detailed geological information on the path taken by the tunnels, see Annex 46 of the EIS).

For an evaluation of the impact and environmental management measures associated with underground installations, see Chapter 6 of the EIS.

Annex 45 of the EIS, Hydro-Geology of Underground Works, presents a general description of the geological conditions that are expected to be found along the lengths of the tunnels; expected permeability based on geological knowledge and hydro-geological conditions in the area, incorporating experience gained during the construction of tunnels for the Alfalfal Plant, which has been operative for more than 17 years; as well as a description that includes the design of the tunnels, providing a brief explanation of the methods to be used to reduce and control water seepage.

With regard to the impact of the path taken by the tunnel passing underneath the El Morado Natural Monument, and measures to be taken to respect the area, see Section I, Responses 4, 5, and 6, in the Addendum.

Remark N° 181
Chapter 7. Environmental
Management Plan
7.2 Environmental Risk Control and Prevention Plan.
7.2.1 Identification of Environmental Risks
7.2.1.2 Description of Risks Generated by
Human Intervention
iv) Risk of Accidental Interference with Items of Cultural
Value

According to the text of the EIS

"Additionally, the Project Owner recognizes the existence of paleontological sites in the Alto Volcán area, and that although these sites are located close to the area where certain surface construction activities are to be conducted, they will not be affected. This issue was rectified at a meeting between the Project Owner and the Chilean Paleontological Society".

The Chilean Paleontological Society refutes the statements made by the Project Owner in the text quoted above, and indicates that at a meeting held with AES Gener on January 3, 2008, it made clear to that company's representatives that, according to background information available, the Project would affect sites of paleontological interest, whether works were conducted on the surface or underground (El Volcán Tunnel). Specifically, surface works were planned for implementation in sites of paleontological interest. Additionally, the damage to be caused to paleontological sites by the El Volcán Tunnel would be a pressing concern, referring to the Lo Valdés Formation, through which the tunnel would pass.

Thematic responses

ARQ Archeological and Paleontological Heritage Sites:

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

AGU.01 Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum**.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) **production of cultural information material**
- b) **creation of a viewpoint**
- c) **fossil trail**

For more information and details on the preservation of heritage value and

paleontological resources, please see **Annex 14 of Addendum 1**.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

PRO.03.01 Intakes

The Alto Maipo Hydroelectric Project (PHAM) plans to capture water resources at eight different points. The Project holds in-stream water rights at each of these points, and the concessions granting rights at most of these points include ecological flow rate stipulations issued by the Directorate General of Water (DGA).

The water intake points are as follows:

For the Alfalfal II Plant: the El Morado Stream, the La Engorda Stream, the Colina Stream, the Las Placas Creek, and the Yeso River. For the Las Lajas Plant: the Alfalfal Plant discharge, and the Colorado River at the Maitenes Intake. For a detailed description of planned installations, see Chapter 2, Section 2.2.2 of the EIS, and attached Annexes 1 and 8.

See Annex 12 of the EIS for a map of intakes in the PHAM area of influence. See Table 2.2.2, in Chapter 2 of the EIS, for the characteristics and descriptions of the intake installation.

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For clarifications regarding the El Yeso Reservoir, see Section I, question 27 in the Addendum.

For details on the construction methods and the mitigation and compensation measures planned by the Project to address the environmental impact of the intakes, see Annex 6 of the Addendum.

PRO.03.02 Tunnels

The majority of the Project is planned for installation underground. The general characteristics of the tunnels are described in Chapter 2 of the EIS, Table 2.2.5 (for detailed geological information on the path taken by the tunnels, see Annex 46 of the EIS).

For an evaluation of the impact and environmental management measures associated with underground installations, see Chapter 6 of the EIS.

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With regard to the impact of the path taken by the tunnel passing underneath the El Morado Natural Monument, and measures to be taken to respect the area, see Section I, Responses 4, 5, and 6, in the Addendum.

PRO.03.03 Encampments and Works Installations

For details on the creation of encampments and works installations, please see Chapter 2, Section 2.3.2.4 in the EIS.

For information on PHAM encampment and work site approach routes, see EIS, Chapter 2, Table 2.1.2,

For information on regulations, see Chapter 3 of the EIS and Annex 33, General Operating Regulations for Encampments and Work Sites.

For information on the management of waste produced at work sites and encampments, see Annex 18 of the EIS, "Site Installation Waste Management Plan".

For information on the discharge of treated wastewater, see Response 26 in the Addendum. For information on human consumption of water at encampments and works installations, see Chapter 2, Section 2.3.2.4, parts b and i.

For an assessments of the impact of the creation of encampments and works installations, monitoring methods, and conditions, see Chapter 6 of the EIS.

Remark N° 182
7.2.6 Specific Risk Control Measures in Areas with Paleontological Resources (Valle del Arenas)

- SPACH remark. Paleontological resources may be affected by the implementation of surface and underground works.

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

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For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

AGU.01 Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
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ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

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In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material
- b) creation of a viewpoint
- c) fossil trail

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

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The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect

caused by the annoyances that are typical of construction works. Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

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For information on the Project's impact on water quality in the area's watercourses arising as a result of the construction of intakes, see Section I, Question 3 in the Addendum.

For the intake maintenance plan, the Chapter 2, Section 2.2.2 of the EIS, and additional information provided in Section I, Question 11 of the Addendum.

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For details on the construction methods and the mitigation and compensation measures planned by the Project to address the environmental impact of the intakes, see Annex 6 of the Addendum.

PRO.03.02 Tunnels

The majority of the Project is planned for installation underground. The general characteristics of the tunnels are described in Chapter 2 of the EIS, Table 2.2.5 (for detailed geological information on the path taken by the tunnels, see Annex 46 of the EIS).

For an evaluation of the impact and environmental management measures associated with underground installations, see Chapter 6 of the EIS.

Annex 45 of the EIS, Hydro-Geology of Underground Works, presents a general description of the geological conditions that are expected to be found along the lengths of the tunnels; expected permeability based on geological knowledge and hydro-geological conditions in the area, incorporating experience gained during the construction of tunnels for the Alfalfal Plant, which has been operative for more than 17 years; as well as a description that includes the design of the tunnels, providing a brief explanation of the methods to be used to reduce and control water seepage.

With regard to the impact of the path taken by the tunnel passing underneath the El Morado Natural Monument, and measures to be taken to respect the area, see Section I, Responses 4, 5, and 6, in the Addendum.

PRO.03.03 Encampments and Works Installations

For details on the creation of encampments and works installations, please see Chapter 2, Section 2.3.2.4 in the EIS.

For information on PHAM encampment and work site approach routes, see EIS, Chapter 2, Table 2.1.2,

For information on regulations, see Chapter 3 of the EIS and Annex 33, General Operating Regulations for Encampments and Work Sites.

For information on the management of waste produced at work sites and encampments, see Annex 18 of the EIS, "Site Installation Waste Management Plan".

For information on the discharge of treated wastewater, see Response 26 in the Addendum. For information on human consumption of water at encampments and works installations, see Chapter 2, Section 2.3.2.4, parts b and i.

For an assessments of the impact of the creation of encampments and works installations, monitoring methods, and conditions, see Chapter 6 of the EIS.

Remark N° 183 Global Issue

I believe that if this Project is not rejected then it will affect us, due to its impact on the landscape, biodiversity, the river basin equilibrium, the filling of aquifers, air quality, and quality of life.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS**.

This section presents information characterizing the basins and tributaries of the Volcán, Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex

13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS**.

AGU.03.03 Underground water

Underground water will not be affected in any way by the operation of the Project. This is the case because the underground water flow capacity in each sector of the aquifer associated with the Maipo River is much lower than the minimum flow running through each section of the river, and therefore under all circumstances the aquifers shall remain saturated. Thus, underground water sources present in the area shall also not be affected. The PHAM plans to construct 70 km of tunnels, of which approximately 50 km correspond to headworks or hydraulic pressure tunnels, the remainder being access tunnels for use during construction of the project and for subsequent operation of the power plants (see **EIS Chapter 5, Section 5.3.5.3**).

Most of these tunnels have been designed to operate at variable internal pressures, with a maximum achieved at certain points of a little more than 450 m. The design requirement for these tunnels is that the lower limit of principal compression in the surrounding rock medium is always less than the operating pressure, such as to maintain a sufficient safety margin to prevent alterations in natural permeability dynamics through hidrojacking. In areas where this design principle is not guaranteed, the Project plans to install impermeable tunnel linings (**EIS, Annex 45.4**).

During the excavation of these tunnels, it is possible that the work front may have to pass through permeable rock strata - leading to seepages of water into the tunnel, the magnitude of which will depend on the permeability of the rock, the depth of the tunnel, and the level of the water table. In some areas, tunnel wall treatments may have to be applied in order to prevent water transfer into or out of the headworks tunnels.

The Project does not plan to make use of any water seepages that may arise, in the generation of electricity. Additionally, the overarching design principles underpinning the Project are oriented towards limiting seepages during construction, in order to establish suitable conditions for efficient

tunnel excavation activities. The same principle applies to methods to limit the infiltration of water from the tunnels into the rock mass, thus avoiding water loss during operations.

Additionally, these procedures guarantee that any groundwater that may intercept the tunnels shall suffer no change in its natural hydrological dynamics, or impact on any foreign components or water other than the water entering the system (**EIS, Annex 45**). Special attention will be paid to the quality and characteristics of any water that may eventually return to the natural water system through the tunnel access windows, and therefore construction contracts will specify measurements that must be made and the treatment that shall be required for subsequent disposal of such water, in order to ensure compliance with the quality requirements for water discharge into natural watercourses, under regulations currently in force.

In the event of seepages of water at high temperature and possible acidic composition, it is important to make clear that in general there shall be no major differences in the methods used to render the tunnel walls impermeable. During all site surveys conducted, research boreholes and surface geological maps produced to date applying to the areas through which the tunnels will pass, no evidence whatsoever has been found to lead to any prediction of the presence of water at high temperatures, or with mineral or acidic contamination. As additional background information, during the construction of the Alfalfa Plant - with the excavation of 35 km of tunnels - no events similar to those indicated above occurred. Notwithstanding the above, the specification establish that, in locations located close to potentially critical areas, the contractor must drill survey

boreholes of between 25 m and 30 m in length ahead of the tunnel work front, in order to gain early warning of seepage problems and thus be able to apply impermeable tunnel wall treatments as required. See **EIS, Annex**

45.4.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

SLD.02 Atmospheric

Although the Project involves surface construction activities, which will lead to the emission of particulate matter, plans call for the implementation of a suite of mitigation measures that will result in a considerable reduction in emission, not only of the PHAM itself but also as against the baseline of current particulate emissions through the Project's area of influence. In addition to the above, these considerations should be evaluated bearing in mind the fact that most of the Project's works will be underground, not producing any emissions of particulate matter. Conversely, given that most of the Project's works are to be located in high mountain areas, it can be stated that the prevailing ventilation conditions in this environment will facilitate the dispersion of dust, with a natural reduction in emissions during the winter season as a result of the additional moisture contributed by rain and snow precipitation.

For more information on emissions compensation measures, see **Annex**

5 of the EIS.

SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

Remark N° 184 Inconsistencies

The ecological flow rates calculated by the company are not sufficient to preserve aquatic and riverbank life. They do not comply with the quantitative requirements that define the concept of an ecological flow rate. They feature inconsistencies, with the extraction of quantities of water larger than those possible during certain periods. The PHAM states that only 12% of river water flow will be abstracted; this figure was checked and found not to be the case for the Maipo River (50%).

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of

environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.01 Regulations

The Project Owner shall comply with all legal environmental and sector-based regulations and requirements in force and applicable to the Project during the different phases of its development. The Project Owner has guaranteed compliance with the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and compliance with sector environmental permits.

Environmental regulations that apply to the Project have been identified based on its activities' potential environmental impacts affecting flora and fauna. The full extent of these regulations is included in **Chapters 3 and 4 of the EIS, and in Section 2, Question 1 in Addendum 1**.

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neoporteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo Spinolosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Lilolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend

to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

PRO.02 EIS Additional and Complementary Information

In accordance with consultation procedures conducted by oversight services, further studies and information have been incorporated into Addendum 1, which complements existing information provided in the EIS. Regarding ecological flow rates (**Annex 17**), cultural heritage (**Annex 14**) and the management of summer grazing areas (**Annex 6**).

Remark N° 185 River Basin Equilibrium

The equilibrium state of an ecosystem depends on the interaction of its components, and therefore a decline in moisture levels is not compatible with the preservation of the area's plant life, wildlife (habitat for a number of bird species, insects, and the Elegant Fat-tailed Mouse Opossum (*Thylamys elegans*)), or to prevent ice melt. Is the preservation of the equilibrium state guaranteed? What consideration is given to the Ministry of Mining Supreme Decree 78/06 (area of scientific mining interest)? What consideration is given to the Santiago Metropolitan Master Plan (Upper Maipo River Basin: key area of ecological preservation for the protection of high altitude wetland and stream micro-habitats)? What consideration is given to the Santiago Metropolitan Region Biodiversity Conservation Strategy (COREMA Metropolitana)?

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic

autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the

basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.01 Regulations

The Project Owner shall comply with all legal environmental and sector-based regulations and requirements in force and applicable to the Project during the different phases of its development. The Project Owner has guaranteed compliance with the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and compliance with sector environmental permits.

Environmental regulations that apply to the Project have been identified based on its activities' potential environmental impacts affecting flora and fauna. The full extent of these regulations is included in **Chapters 3 and 4 of the EIS, and in Section 2, Question 1 in Addendum 1**.

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neoporteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Liolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopus cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project

Owner, see Annex 4 of the Addendum.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1)

Chapter 3 of the EIS provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

Remark N° 186 Landscape

Preserving the visual quality of the landscape is one of our priorities, as this feature is not only of significant value to residents, those who work in the area or who spend their weekends relaxing there; it is also one of the country's most heavily visited tourism areas (SERNATUR). In this remark, we include the preservation of visual contact with all features that make up the landscape (water, plants, wildlife, valleys, glaciers) at a level effectively identical to the present situation. What will happen regarding this issue? Is it guaranteed? How will muck disposal avoid affecting this issue?

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term

mutually beneficial relationships between the project and its surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **MAR Muck**

The PHAM plans to construct approximately 70 km of tunnels. The excavation of these tunnels will generate inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of inert material produced in road building and the construction of buried conduits.

This muck material will be deposited in the 14 muck disposal heaps that the Project plans to create. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria. For more information, please see **Annex 6 of the EIS** and **Annex 3 of the Addendum**.

MAR.01 Regulations

The Project Owner has made available a Management Plan for "Project Muck Disposal Heaps", which contains information on the technical, environmental, and safety specifications of the heaps, as well as recommendations

contained in the Ministry of Public Works' 2004 Environmental Management Plan Manual for Works Subject to Concessions. In particular, the Plan establishes the environmental considerations adopted for the operation of the muck disposal heaps, to be implemented during the construction of tunnels and roads under the PHAM.

In order to comply with the environmental management measures contained in the EIS, an Environmental Monitoring Program will be conducted, with the aim of verifying the effectiveness of these measures and compliance with them. For details on the principal actions included in the Monitoring Program, and for the various stages of functionality of the muck disposal sites, see **Annex 6 of the EIS** and **Annex 3 of Addendum 1**.

For more information on the specific regulations applicable to the Project, and compliance therewith, see **Chapter 3 of the EIS**.

MAR.02 Location

The PHAM calls for the creation of 14 muck disposal heaps, for the disposal of waste material from tunnel boring and smaller quantities of inert waste from the construction of roads and buried conduits. Maps of the muck disposal heaps, and a copy of the muck disposal heap management plan, are included in Annex 6 of the Project EIS. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria.

From a technical and safety perspective, the muck disposal heap sites have been located as close as possible to exit points from tunnels and to surface work sites, in areas not at risk to landslides or landslip events.

The following aspects have been taken into account as environmental criteria in site selection: Sites have been selected that are distant from any settlements or any housing used on a permanent or temporary basis.

Priority has been given to selecting sites with low visual impact - that is, in areas that are distant from potential observation points on public highways or high ground.

In the Project area's higher elevation regions, the disposal heaps have been sited up against natural topological features, such that the emplacement of the heaps' layers forms a continuation of the general landform structures of the area.

In general these are areas that are of low value as a habitat for plant life (soils with usage capacity ratings V, VI, and VII), and efforts have been made to avoid modifications to the original land form structures present or to surface watercourses.

Surface surveys have been conducted in all of these regions, as details in **Section 5.8, in Chapter 5 of the EIS**, to rule out the presence of sites of archeological and/or paleontological value at the muck disposal heap sites.

For more information, see **Annex 6 of the EIS** and **Annex 3 of Addendum 1**.

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is

expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.
Given that most works are to be located underground and in high mountain areas,

a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

TUR.03 Visual impact

The Project is to be located, taking into account esthetic and perceptual considerations and emphasizing the characterization and appraisal of the issues of visibility, quality, and visual fragility of the landscape.

In terms of Landscape Alteration or Landscape Impact associated with this infrastructure project, potential effects are classified as either limited duration - generally applying during the construction phase - or permanent, for effects that shall persist during the operations phase and continue throughout the working life of the Project. A qualitative methodology

is used to study these effects, whereby the first phase consists of identifying sources of visual impact, and the second phase relates to identifying and classifying environmental impacts.

As a general rule, it is assumed that impact on the landscape during the construction phase shall be temporary, mainly due to the transitory nature of the sources of impact, the low level of prior human activity in certain areas, and the relatively low level of physical and visual accessibility of a significant proportion of the area subject to intervention.

As most of the Project construction works will be situated underground, during the operations phase the main visual signatures of its existence will be the intakes and access roads. For further information on the methodology used for landscape impact assessment, see **Chapter 6, Section 6.1.4.10 of the EIS, and Annex 17 of**

Addendum 1.

Remark N° 187 Quality of Life

What will happen with truck traffic? We want an environment free of traffic congestions, air pollution, and visual and noise pollution. How will this issue be guaranteed?

Thematic responses

SLD Health Impact

The Project owner shall take responsibility for ensuring compliance with health and safety regulations, in order to prevent any possible risk to health and physical integrity for the inhabitants of San José Maipo as well as the persons working on the Project.

SLD.01 Regulations

The Project Owner is subject to specific environmental regulations that apply to the Project, determined based on environmental impacts associated with noise and air pollution during works construction and other activities. For further details, see **Chapters 3.2.2 and 3.2.1 in the EIS**. The Project Owner shall take responsibility for compliance with the monitoring plan.

SLD.02 Atmospheric

Although the Project involves surface construction activities, which will lead to the emission of particulate matter, plans call for the implementation of a suite of mitigation measures that will result in a considerable reduction in emission, not only of the PHAM itself but also as against the baseline of current particulate emissions through the Project's area of influence. In addition to the above, these considerations should be evaluated bearing in mind the fact that most of the Project's works will be underground, not producing any emissions of particulate matter. Conversely, given that most of the Project's works are to be located in high mountain areas, it can be stated that the prevailing ventilation conditions in this environment will facilitate the dispersion of dust, with a natural reduction in emissions during the winter season as a result of the additional moisture contributed by rain and snow precipitation.

For more information on emissions compensation measures, see **Annex 5 of the EIS**.

SLD.03 Acoustic

In the field of Environmental Impact, specifically acoustic impact, the Project Owner has conducted a wide-ranging study to estimate acoustic emissions generated during the construction of the PHAM. For more information on the acoustic impact of the PHAM, and methodologies, modeling techniques, and actions to be taken to minimize such impact, please see **Annex 30 of the EIS** and **Section II, Question 8 in the Addendum**.

Plans for blasting activities, specifically including the frequency, quantity, timing, and work periods of blasting, will be determined on site in accordance with the characteristics of each works activity and work site. Regarding works activity scheduling, priority will be placed on completion of surface works during the daytime (8:00-21:00 hrs.); for blasting activities, plans call for an information program at the time of the activity, defining and clarifying the periods when noise-producing activities will take place, in order to integrate the community into efforts towards the completion of the Project.

Another point worthy of emphasis is that the work sites (tunnel excavation, access windows, and entrances/exits) will not be sited close to settlements, thus preventing most of the potential acoustic impact that could be caused by the PHAM.

Wildlife rescue will be conducted through animal rescue activities based on the trapping of reptiles and amphibians before explosives are used, before service tracks are built, and before the modification of river flow.

Finally, and in order to comply with the requirements set forth above, the Project Owner shall be subject to:

1. Supreme Decree 146 (Establishing Standards on the Emission of Nuisance Noise Generated by Fixed Sources) establishing maximum permissible sound pressure levels, corrected according to technical criteria to evaluate and classify nuisance noises generated by fixed sources affecting the community, such as industrial, commercial, leisure, and artistic activities.
2. Exempt Decree 130 (Establishing restrictions on the movement of cargo trucks). The movement of trucks larger than 4 tons will be suspended from 14:00 hours on Saturdays through to midnight on each Sunday night on Route G-25 and Route G-421.

For more information on the acoustic impact of the PHAM, and regulations (Chapter 6 of the EIS), mitigation measures, methodologies, modeling techniques, and actions to be taken to minimize such impact, please see Annex 30 of the EIS, as mentioned above.

Finally, in order to verify the effectiveness of the mitigation measures taken, noise monitoring will be conducted at 8 sensitive points, following the procedure established in MINSEGPRES Supreme Decree 146/97, in order to verify compliance with the maximum permitted limits for sound pressure level (see details in **Chapter 8 of the EIS, Section 8.2.2**).

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.03 Congestion

When PHAM Project construction activities begin, there will be an increase in road traffic movements in the immediate surroundings of the work area. This vehicle movement will be related mainly to the transport of supplies and machinery to the works installations, transport of excavation spoil to muck deposition sites, and, to a lesser extent, the transport of personnel to the work sites. For more information on traffic flow increases resulting from the Project, see **Chapter 2, section 2.4.1, part E, Annex 14 of the EIS, and Annexes 9 and 14 of Addendum 1**.

The PHAM highway impact analysis takes into account all works and activities under the Project, including the transport of supplies, machinery, and personnel. According to modeling studies, it is predicted that there will be no significant impact on highway usage (levels of saturation of new and existing roads and intersections). For more information on the Project's road operations, measurements used and models derived, see **Annexes 9 and 15 of the Addendum**. Additionally, increases in noise emissions are analyzed in **Section 6.4.1.2 of the EIS**.

Notwithstanding the above, it is assumed that, given that certain construction activities shall be conducted at the same times that other road users wish to make use of certain sections of specific roads, a certain level of annoyance may be caused, and for this reason the PHAM has adopted a number of control and mitigation measures, indicated in **Chapters 6 and 2 of the EIS** and in **Annex 14 of the EIS, as well as Annexes 9 and 17 of Addendum 1.**

It is considered likely that, in view of the predominance of the tourist industry in the local economy of the district of the Maipo Valley, a certain level of annoyance may be caused at certain points and at specific moments, mainly due to conflicts between PHAM road usage and the movements of visitors. As indicated in the EIS Baseline Study, this is an area where tourists come to enjoy walks and peace and quiet, on weekends and holidays. In particular, there are 2 specific tourism attractions located in the same areas as site installations: the El Yeso and the Alto Volcán area, where special measures shall be taken, as specified in **Chapter 6 of the Project EIS.** Additionally, **Annex 32 of the EIS** specifies emergency procedures to be adopted in the event of transport accidents caused by project vehicles.

Remark N° 188 Corporate Responsibility

What consideration will be given to the law that whoever pollutes pays for it? We want the Cajón del Maipo area to be able to conserve its present level of quality (Law 19,300). Who will take responsibility for the full magnitude of each impact? Will this be the company? Has this been demonstrated? How will effective enforcement be ensured? We are aware that this not one of the strengths of our country.

Grounding for Technical Information

Hydrological study conducted by hydraulic engineer Jack Stern. Official information provided by the DGA (database covering a period going back 70 years). Reports prepared by the Universidad de Chile, Universidad Católica, and Universidad Andrés Bello

Thematic responses

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly

frequented, minimizing their visual impact.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1)

Chapter 3 of the EIS provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

PRO.01.01 Compensation

The concept of compensation refers to the act of indemnifying damages or harm caused. Within the framework of the EIS, the Project Owner has issued a proposal to the competent authority regarding a suite of environmental management measures aiming to minimize, compensate, and restore the Project's impacts, making their implementation sustainable (Chapter 6 of the EIS).

In this regard, compensation is understood to be included in the spirit or end goal of the environmental management measures proposed by the Project Owner, following the evaluation of the direct and indirect effects of the PHAM on each of the environmental components stipulated in Supreme Decree 95, SEIA Regulations.

Remark N° 196 Drinking Water Supply System in the Settlement of El Manzano

This settlement is not included in the Aguas Andinas S.A. concession area, nor is it covered by any other drinking water supply company. Water is distributed to different properties through actions managed by the community's associations of property owners, which are non-profit institutions governed by Law 19418 and complementary statutes and regulations, taking responsibility for representation, construction, and maintenance of infrastructure to permit the equitable distribution of water resources obtained from Aguas Andinas, or any other inflow replacing this supply if and when it is not available.

The water that we are supplied is dependent on production, and governed by an agreement signed in 1988 between EMOS (now Aguas Andinas) and the community of El Manzano, which agrees the supply of

100 m³ per day, delivered at a large scale water meter maintained by the company among the water intakes that it possesses in the El Manzano Stream; this supply agreement is subject to total suspension for several days at a time, during any period of the year, when water exhibits turbidity, or in the event of emergencies or any other event seen by the company as good cause to suspend service.

The shortfall in drinking water is made up by making use of a proportion of the end user water rights held by members of the association of property owners and normally used for land irrigation, organized by the El Manzano Channel Water Community; this causes serious individual infrastructure costs, in order to permit this irrigation water to be decanted, collected, and chlorinated so that it can safely be used, without risks to families consuming it, and in accordance with universal practices recommended for similar cases.

To date, 324 land owners are members of the drinking water distribution system association, and 91 land owners have yet to join the system, in a land area of 292 hectares - all directly or indirectly supplying our homes with the 100 m³ of water supplied to us each day by Aguas Andinas, and using part of the end user water rights that we hold over water from the Colorado River. This quantity will rise by 885% during the next three five-year periods, due to the implementation of the District Master Plan, which authorizes a considerable expansion in our settlement's population - which will still be supplied with drinking water using the same system.

Thematic responses

Specific response

The Project Owner reiterates its commitment to ensuring that necessary infrastructure exists in the river to permit water to enter the channels at all times, in accordance with the rights granted and the availability of the river throughout the life of the PHAM project.

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see **Table 2.3.4** in **Chapter 2 of the EIS**.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena

Channel intake, located approximately 4.5 km upstream of the

Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 "Hanging" **channels**

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.04.02 **Maximum flow rates to be abstracted**

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 **Ecological flow rates**

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally

complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

AGU.05 Drinking water supply

Construction works and/or activities involved in the project (roads, movement of materials, transport of different products, etc) shall have no effect or impact whatsoever on the quality or security/safety of water supply in the Maipo River system. During the construction phase, Project interventions affecting watercourses shall cause only temporary effects resulting from Earth moving during excavation and other construction activities. This intervention shall affect small areas over short time periods, as it shall last only during the period while these installations are under construction (see **Section 6.4.1.4 of the EIS and Section VII, Question 17, in the Addendum**).

During operations, the PHAM shall not affect the Laguna Negra-Lo Encañado and El Yeso Reservoir system, which is managed by the company Aguas Andinas S.A, in its capacity as holder of the drinking water concession for Santiago; nor shall the Project affect the operational dynamics of the drinking water supply system. Therefore, the implementation of the PHAM does not imply any impact whatsoever on the supply of drinking water (see **Section I, responses 27 and 29, in the Addendum**).

Furthermore, the water abstracted by the Project shall be returned to the river 5 km upstream of the Toma Independiente or Independent Intake, operated by the company Aguas Andinas S.A., which abstracts water for drinking water supply to the city of Santiago; therefore, the PHAM shall not affect normal operations of this system. The PHAM shall only affect the delivery point of water in the tributaries of the Maipo River; in other words, water that currently does not drain into the Maipo River shall not be incorporated into that river's total flow.

However, in the event that an incident may arise as a result of an accident during construction, such as accidental spillages or rock falls, the procedures described in the Contingency Plan shall be implemented, consisting of a suite of actions to solve associated problems. This plan is explained in detail in **Chapter 7 of the EIS, Section 7.2.5**.

AGU.05.01 Drinking water quality

The process of hydroelectric power generation does not affect the physical/chemical qualities of water. Additionally, the PHAM does not plan to implement regulation installations that retain sediment. Thirdly, downstream of the discharge point the natural river conditions are maintained with regard to flow rate and physical/chemical properties.

During the construction of installations to be located in watercourses, the free-flowing course of the river is maintained through the construction of diversions through pipes laid along the river course for such purposes, or through channels that divert all flow, allowing free water circulation with no effect whatsoever on quality (see **Section I, Question 28, in the Addendum**).

The Project owner shall not make use of the Lo Encañado Lake or water usage rights owned by Aguas Andinas S.A. for this Project, instead opting to forgo usage of these resources and to replace the role that would have been fulfilled by the Lo Encañado Lake with a forebay located on a widening of the Alfalfal II plant headworks, located in the Alto Aucayes area on the Colorado River Valley (for details, see **EIS 2.2.1**). The Lo Encañado area shall be assigned a status of controlled access area at all times: it shall not be subject to any intervention whatsoever.

The Project Owner has made available a Water Quality Monitoring Program, with specifications for application during both the construction and operations phases. This program espouses a commitment to verify the effectiveness of environmental control measures designed to minimize the effects of works construction activities during the construction phase.

For further information on the Monitoring Program, see **Sections 8.2 and 8.3 in Chapter 8 of the EIS**.

Remark N° 197 Colorado River Sedimentation Study

No sedimentation study is included applying to the Colorado River. In view of the considerable drop in flow rate in this watercourse, and the discharge of the forebays and sand traps of the Alfalfal, Alfalfal II, and Las Lajas Power Plants, which will empty all sand, silt, and sediment built up during the decantation and storage of water into this watercourse, there will be direct effects on the decantation, clarification, storage, and chlorination structures used to treat our irrigation water to permit risk-free use as drinking water, in compliance with universal practices recommended for similar cases.

A sedimentation study should be presented that will permit the increase in sand, silt, and sediment carried in the water of this river to be gauged. Additionally, please consider economic compensation for this case, in consideration of the harm that will be caused to our decantation, clarification, storage, and chlorination infrastructure, used in the exercise of our end user water rights over water abstracted from the El Manzano Channel Intake

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfal Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This

explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is

- greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (AGU.06.01), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity. Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted.

It can be concluded that the Maipo River system can be managed such that, With the Project operational, present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them.

Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

AGU.06.04 Discharge effects

Water capture in advance of in-situ gravel removal leads first to a reduction in sediment load in water carried through the headworks to the turbine rooms, while the solid materials that is retained is returned to the river. At the point where water is discharged from the plants (Las Lajas area), water that has passed through the turbines - which contains a certain quantity of sediment - once again mixes with the water in the rivers, returning to its original conditions in terms of average sediment load (**Addendum, Section I, Question 28**).

At the point where water is returned to the Maipo River, in the Las Lajas area, there will be no degradation of the riverbed as it is composed entirely of rocks. It should be mentioned that the flow rate discharged from the PHAM at this point is always lower than the flow rate in the Maipo River just upstream.

During the operations phase of the Project, planned maintenance activities do not include any cleaning of tunnels and culverts. Inside the tunnels, the cross sectional area for water flow is small enough to prevent sedimentation. This is shown through the operation of the Alfalfa Plant for 20 years without any cleaning of the tunnels being included among maintenance activities.

The only operations that lead to the discharge of sediment are the discharge of gravel traps at the inlets, and the flushing of the sand traps, returning sediment to the river once a certain volume has built up within them. These operations are conducted intermittently and for short time periods (1 minute for sand traps, 10 minutes for gravel traps), at variable frequency depending on the season. For more information see the **Addendum, Section IV, Question 3**.

PRO.01.01 Compensation

The concept of compensation refers to the act of indemnifying damages or harm caused. Within the framework of the EIS, the Project Owner has issued a proposal to the competent authority regarding a suite of environmental management measures aiming to minimize, compensate, and restore the Project's impacts, making their implementation sustainable (Chapter 6 of the EIS).

In this regard, compensation is understood to be included in the spirit or end goal of the environmental management measures proposed by the Project Owner, following the evaluation of the direct and indirect effects of the PHAM on each of the environmental components stipulated in Supreme Decree 95, SEIA Regulations.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on

mountain sports tourism is available in Annex 35 of the EIS,
"Complementary survey of tourist attractions and tourism services

in the District of San José de Maipo”, and Annex 36 of the EIS, “Survey of high mountain activities”.

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. The study also investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 198 Effects on Water Quality in the Colorado River

In view of the considerable drop in flow rate (up to 12 m³/s) and the increase in sand, silt, and sediment load, the current **physical/chemical, biological, and acidity characteristics of the water will be affected.**

A study should be presented permitting understanding of whether the water will suffer variations in its **physical/chemical, biological, and acidity characteristics**, such that it may be used risk-free, under the parameters of universal practices recommended for similar cases; additionally, please consider **economic compensation for this case, in consideration of the harm that will be caused to our decantation, clarification, and storage infrastructure, used in the exercise of our end user water rights over water abstracted from the El Manzano Channel Intake.**

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum.**

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing

less than 30% of sediment deposited in that zone.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water,

which will pass through the turbines and then be returned to the river. This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.01.01 Compensation

The concept of compensation refers to the act of indemnifying damages or harm caused.

Within the framework of the EIS, the Project Owner has issued a proposal to the competent authority regarding a suite of environmental management measures aiming to minimize, compensate, and restore the Project's impacts, making their implementation sustainable (Chapter 6 of the EIS).

In this regard, compensation is understood to be included in the spirit or end goal of the environmental management measures proposed by the Project Owner, following the evaluation of the direct and indirect effects of the PHAM on each of the environmental components stipulated in Supreme Decree 95, SEIA Regulations.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. The study also investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 199 Effects on Sedimentation Volume due to Actions at Forebays and Sand Traps

Given that the quantity of water to be used in operating discharge spillways into the Colorado River, or the quantity of material and sediment that will build up in the forebay and sand traps of the Alfalfal, Alfalfal II, and Las Lajas Plants, for which rights exist, for maximum periods of 15 minutes 6 times per day, these should be added to the 12 m³/s excess in the river, and the Colorado River will therefore suffer permanent changes in its sedimentological volume (mass and volume, which will result in extreme size and force with no control) flowing into the river, considerably adding to risks affecting the structures of the El Manzano Channel Intake, which is located downstream of these plants.

Economic compensation should be agreed relating to this effect, to cover damage that may be caused to the El Manzano Channel Intake structures by these effects.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfal Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.04 Discharge effects

Water capture in advance of in-situ gravel removal leads first to a reduction in sediment load in water carried through the headworks to the turbine rooms, while the solid materials that is retained is returned to the river. At the point where water is discharged from the plants (Las Lajas area), water that has passed through the turbines - which contains a certain quantity of sediment - once again mixes with the water in the rivers, returning to its original conditions in terms of average sediment load (**Addendum, Section I, Question 28**).

At the point where water is returned to the Maipo River, in the Las Lajas area, there will be no degradation of the riverbed as it is composed entirely of rocks. It should be mentioned that the flow rate discharged from the PHAM at this point is always lower than the flow rate in the Maipo River just upstream.

During the operations phase of the Project, planned maintenance activities do not include any cleaning of tunnels and culverts. Inside the tunnels, the cross sectional area for water flow is small enough to prevent sedimentation. This is shown through the operation of the Alfalfal Plant for 20 years without any cleaning of the tunnels being included among maintenance activities. The only operations that lead to the discharge of sediment are the discharge of gravel traps at the inlets, and the flushing of the sand traps, returning sediment to the river once a certain volume has built up within them. These operations are conducted intermittently and for short time periods (1 minute for sand traps, 10 minutes for gravel traps), at variable frequency depending on the season. For more information see the **Addendum, Section IV, Question 3**.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature

no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned

to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly

frequented, minimizing their visual impact.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1)

Chapter 3 of the EIS provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

PRO.01.01 Compensation

The concept of compensation refers to the act of indemnifying damages or harm caused. Within the framework of the EIS, the Project Owner has issued a proposal to the competent authority regarding a suite of environmental management measures aiming to minimize, compensate, and restore the Project's impacts, making their implementation sustainable (Chapter 6 of the EIS).

In this regard, compensation is understood to be included in the spirit or end goal of the environmental management measures proposed by the Project Owner, following the evaluation of the direct and indirect effects of the PHAM on each of the environmental components stipulated in Supreme Decree 95, SEIA Regulations.

Remark N° 200

Maintenance Program and Emergency Plan

No maintenance program (annual, every five years, etc.) is presented for the Alfalfal II and Las Lajas Plants, or the Las Lajas discharge spillway. Similarly, no emergency plan is presented, for activation in the event of a situation giving rise to a need to shut down the plants or the tunnel.

A maintenance plan and an emergency plan should be attached, providing information on the volume of water to be discharged into the river, and guaranteeing the prevention of damage to structures, buildings, or persons who may be present, or who work in the Colorado River downstream of the discharge point, specifying the measures taken to prevent and mitigate possible emergency situations.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

RSG Risk

The Project Owner possesses a general risk prevention strategy that imposes certain measures on the Project during its different stages of advance. This strategy features the following components:

- a) Measures incorporated into the Project's engineering design.
- b) Systematic verification of compliance with applicable regulations c) Establishment of restricted areas
 - c.1) Area restricted due to their archeological, paleontological, or heritage value
 - c.2) Area of natural value that requires protection by the Project
 - c.3) Officially protected area.
- d) Expert supervision during construction
- e) Training regarding environmentally sensitive issues
- f) Internal risk management and accident prevention programs g) Separation of works installations and encampments

For further information on each of these points, please see **Chapter 7 of the EIS**, which specifies the **Environmental Management Plan**, the **Risk Control and Prevention Plan** designed for the Project, the safety measures to be adopted in light of the risks identified, and, finally, the **Accident control plan**, to be activated in the event of the failure of the preventive measures taken by the Project Owner. Furthermore, **Annex 32 of the EIS** presents the **Risk and Contingency Prevention Plan** for contractors.

RSG.01 Load rejection

During the operation of the power plants, situations may arise that necessitate the stoppage of one or both plants for a certain period of time. Two temporary phenomena occur at such times, the effects of which must be analyzed. These phenomena are mass oscillations within tunnels carrying water under pressure, and impact on the Maipo River system's flow dynamics.

A special situation arises in the operation of a hydroelectric plant when a sudden stoppage occurs affecting its power generation units or discharge spillways. Load rejection can arise as a result of automatic shutoffs caused by internal or external failures:

- Internal. These situations relate to technical problems within the power plant that require the stoppage of the turbines. This can arise due to a mechanical failure (valve or turbine failure) or an electrical fault in the mechanisms that operate the generator units, or in the high tension switchgear (switches or power line distributors).
- External. External events can lead to total system failure (black out), which is a less frequent situation. This can be caused by a break in the power transmission line that serves both power plants.

Fortunately, such events are infrequent; by way of illustration, see **EIS Annex 17, Table 3.1**, which shows a summary of load rejections that occurred at the Alfalfal Power Plant from 2004 to 2007.

For further information on the analyses taken into account for different potential cases of failures in the power generation units in the Alto Maipo plants, please see **Annex 17 of the EIS and Annex 16 of Addendum 1**.

Remark N° 201 Guarantee Regarding Complementary Works Related to the Project

No guarantee is presented regarding the permanent protection of complementary works to be constructed on the **El Manzano Channel**, defined by AES Gener as **SEMI - PERMANENT WORKS** and which will require periodic maintenance and repair.

It should be born in mind that water and water flow are produced by natural effects, and similarly that all effects that arise in watercourses - rock falls, tree falls, stones and rocks, sandbanks, stagnation of waste matter and trash, and deterioration of works installed in the watercourse - are effects attributable to the nature and volume of the water flowing through the river. Engineering installations built in rivers' watercourses can only be obstructed, damaged, or destroyed as a result of the natural effects of the volume and power of water flow.

The Project Owner should expressly agree a compensatory guarantee payable in the event of any situation that impedes the normal abstraction of water under our 16 irrigation rights, permitting 100% coverage of economic aid necessary for maintenance and repair costs affecting the complementary works on the El Manzano Channel for as long as the hydroelectric plants remain operational. This compensatory guarantee shall not be payable in the case of damage caused by earthquakes or catastrophes, as defined by a decree issued by the competent state body.

Thematic responses

Specific response

The Project Owner reiterates its commitment to ensuring that necessary infrastructure exists in the river to permit water to enter the channels at all times, in accordance with the rights granted and the availability of the river throughout the life of the PHAM project.

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in
**Chapter 2 of the
EIS.**

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988),

with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

PRO.01.01 Compensation

The concept of compensation refers to the act of indemnifying damages or harm caused. Within the framework of the EIS, the Project Owner has issued a proposal to the competent authority regarding a suite of environmental management measures aiming to minimize, compensate, and restore the Project's impacts, making their implementation sustainable (Chapter 6 of the EIS).

In this regard, compensation is understood to be included in the spirit or end goal of the environmental management measures proposed by the Project Owner, following the evaluation of the direct and indirect effects of the PHAM on each of the environmental components stipulated in Supreme Decree 95, SEIA Regulations.

Remark N° 202 Guarantee over End User Water Rights

No permanent guarantee is planned covering usage of the 16 irrigation end user water usage rights held by the users of the El Manzano Channel and abstracted through the intake of that channel.

A compensatory guarantee should be agreed, with payments to be made for each day that 100% of the water over which we hold rights is unable to enter the El Manzano Channel Intake, for any reason. This compensatory guarantee shall not be payable in the case of downtime caused by earthquakes or catastrophes, as defined by a decree issued by the competent state body.

Thematic responses

Specific response

The Project Owner reiterates its commitment to ensuring that necessary infrastructure exists in the river to permit water to enter the channels at all times, in accordance with the rights granted and the availability of the river throughout the life of the PHAM project.

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4**

in Chapter 2 of the EIS.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that is, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights

held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.04 Monitoring and control of flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Q_e) approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility

(**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum.**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility

(**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	Stream gauge station		
	406,157		6,259,100
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum.**

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System

(RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1)

Chapter 3 of the EIS provides detailed information on:

- The legal framework within which the Project was designed;

- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
 - The ways in which the Project will ensure compliance with these regulations.
- The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

PRO.01.01 Compensation

The concept of compensation refers to the act of indemnifying damages or harm caused. Within the framework of the EIS, the Project Owner has issued a proposal to the competent authority regarding a suite of environmental management measures aiming to minimize, compensate, and restore the Project's impacts, making their implementation sustainable (Chapter 6 of the EIS).

In this regard, compensation is understood to be included in the spirit or end goal of the environmental management measures proposed by the Project Owner, following the evaluation of the direct and indirect effects of the PHAM on each of the environmental components stipulated in Supreme Decree 95, SEIA Regulations.

Remark N° 203

Sedimentation: soils and other irrigation structures

No consideration is made regarding the rapid sedimentation that will affect our soils through increases in levels of sand, silt, and other particles carried in our irrigation water, as abstracted from the Colorado River at the El Manzano Channel Intake, settling out in all of our irrigation structures and finally being deposited in our soil - leading to a wide range of problems, such as the blockage or partial blockage of irrigation channels, increases in cleaning costs, reduction in the inherent qualities of agricultural and non-agricultural soils, and other problems that are difficult to classify.

For this reason, a study should be presented evaluating sedimentation across the 292 hectares of land area and the associated irrigation infrastructure that uses water drawn directly from the Colorado River, resulting from increases in levels of sand, silt, and other particles in water running through the El Manzano Channel. Additionally, compensation should be defined corresponding to these effects.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4 in Chapter 2 of the EIS.**

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that is, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum.**

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders

of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and

design" (**Chapter 6.1 of the Sedimentation Study** presented in **Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (**AGU.06.01**), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted.

It can be concluded that the Maipo River system can be managed such that, With the Project operational, present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them.

Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector

environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1)

Chapter 3 of the EIS provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

PRO.01.01 Compensation

The concept of compensation refers to the act of indemnifying damages or harm caused. Within the framework of the EIS, the Project Owner has issued a proposal to the competent authority regarding a suite of environmental management measures aiming to minimize, compensate, and restore the Project's impacts, making their implementation sustainable (Chapter 6 of the EIS).

In this regard, compensation is understood to be included in the spirit or end goal of the environmental management measures proposed by the Project Owner, following the evaluation of the direct and indirect effects of the PHAM on each of the environmental components stipulated in Supreme Decree 95, SEIA Regulations.

Remark N° 204 Loss of Fiscal Holdings

No consideration is given to the loss of fiscal holdings arising through reductions in river and stream flow rates and soil moisture levels caused by the project.

Economic compensation should be agreed, covering the costs of incorporating other spaces into municipal fiscal property holdings, for use in the service of the public at large. E.g. Acquisition and installation of viewpoints along the banks of the Maipo River.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical

variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material**
- b) creation of a viewpoint**
- c) fossil trail**

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

Remark N° 205

Law 19300, General environmental base law, TITLE I, Article 2. "for all legal purposes it should be understood that"...

Environmental damage [is] any significant loss, decline, detriment, or harm caused to the environment, or to one or more of its components.

Environmental Impact Study: a document that provides point by point details of the characteristics of a project or activity that plans to implement modifications in the environment. It should provide documented background information that can be used to predict, identify, and interpret its environmental impact and describe the action or actions that it shall take in order to prevent or minimize all significant adverse effects.

Environmental impact: alteration of the environment, directly or indirectly caused by a project or activity in a specific area.

Reparation: the act of returning the environment, or one or more of its components, to a state similar to that in which it was to be found before damage caused, or, if this is not possible, the re-establishment of its basic properties.

Article 3. Notwithstanding the sanctions stipulated by law, any person or body that through action or gross negligence causes damage to the environment shall be obliged to make full material reparations, at its own expense, if possible, and to provide compensation as stipulated by law.

Both of the parties (Eduardo Atisha Carrasco as the party affected by water abstraction, and the PHAM owned by AES Gener as the other parties) are aware of the following points. AES Gener holds water rights. Eduardo Atisha Carrasco is the owner of a project approved by the ORD. Ministry of Public Works Document 3238, dated November 07, 1997, issued by the Metropolitan Regional Highways Department. The highways department has approved the installation of a sand trap in the Maipo River, for water decantation, diverting some of the river's flow and channeling it through a sand sedimentation installation to settle out material carried in suspension or dragged along the riverbed, which installation was built and installed in the Maipo River valley, adjacent to the property that I own located at Camino al Volcán N° 22705, District of San José de Maipo; this concession over the usage of an item of national property of public usage for the construction and usage, in accordance with a project plan approved by the River Defense Department, of an aggregates separation facility in the Maipo River, where activities relating to the extraction of aggregates are conducted using mechanized techniques, using for these purposes a truck and a front loader, approved on December 3, 1997. In view thereof, I am the holder of a right that I acquired more than a decade ago.

Therefore:

Under the supposition that the maximum flow rate generated by the project corresponds to the design flow rates of the plants - the Alfalfal II plant, with 27 m /s and the Las Lajas Plant with 65 m /s - this water being sourced from the PHAM's headworks intake system. The sum total design flow rate is calculated to be 69.8 m /s.

Point	Maximum design flow rate calculated in
Colina Stream	6
Las Placas Stream	1
El Morado Stream	3.7
La Engorda Stream	2.1
Yeso River	15
Aucayes Stream	2
Colorado River at Alfalfal	30
Colorado River at Maitenes	10

Question 1: Why is the design flow rate exceeded? Merely from the paragraph shown above (quoted directly from the project presentation in chapter 2.3.20), it is clear that the sum of the Alfalfal II and Las Lajas plants' flow rates is 65 m/s, and excess water will be returned to the watercourses; but how am I to know that the water that the PHAM claims to abstract for energy generation will not be the maximum design flow rate thus calculated?

This flow rate is certainly greater than the 4.8 m/s declared for the intake. What is the real input flow rate? I would also like to ask what you are talking about in Annex 20 of the Project. In the Maipo River Sedimentation Study.

1. Summary and conclusions.

Project impact on the system's sedimentation equilibrium...

In view of the absence of integrated management plans for aggregates extraction activities in the Maipo River, annual extraction rates appear to stand at the very limit of the what is sustainable for the watercourse, as deduced for background information reviewed. In this scenario, any perturbation to the system could lead to local riverbed erosion problems, as has occurred in the past due to overextraction during certain periods. Therefore, if the predicted reductions in sediment availability downstream of the Independent Intake implemented by the project come to pass, then although these variations are relatively minor, they may lead to local problems if measures are not taken to ensure more rational management of the watercourse and available water and aggregates resources. This management should clearly be conducted addressing the river basin as a whole, implemented by the competent authority.

It must be born in mind that whether or not the project goes ahead, in the long term the effects of the dam on the El Yeso River will come to be felt, leading to a state of static shielding, preventing this watercourse from contributing any significant quantity of sediment. This results in an estimated reduction of between 0.2 and 0.5 million tons per year in riverbed erosion and entrainment, for the situation without the current project. It is hard to estimate when this effect will be observed, particularly bearing in mind that after 43 years of operation of the dam, there is as yet no significant evidence of the formation of static shielding.

Finally, it should be mentioned that the morphological conditions of the Maipo River at the point where it leaves the valley are a consequence of the natural reduction in its sediment transport capacity, leading to the deposition of a proportion of its sediment load and the formation of multiple watercourses and islands. In view of its characteristics, the Maipo River (and all of the rivers not subject to intervention, in general) is not static, but rather

continually evolving, in a dynamic equilibrium where in flow rate, sedimentation, and river morphology are permanently interacting and modifying each other. The rate at which the system changes may be altered (and accelerated) if it

sediment transport rates into the system are changed, or in the event of excessive extraction of aggregates from the river, water flow may eventually lead to degradation in certain parts of the river system. However, these effects may be reduced or controlled through suitable management of the system; such management must necessarily be based on integrated perspective, including the entire river system through to the river mouth. In this sense, it can easily be seen that at present no rational management system is applied to the extraction of aggregates in the Maipo River System. When the competent authority grants extraction permits based on local criteria, it fails to take into account the reaction of the system, in both spatial and temporal terms, and movement towards a new equilibrium situation.

Question 2: On what grounds does the competent authority take the decision to grant permits based on local criteria? Does this refer to the criteria applied by the Metropolitan Regional Highways Department, now the Hydraulic Works Department? Or the criteria applied by the Mayor of San José de Maipo? Or do the criteria applied by the Municipal Council take precedence? Or the criteria that should now be applied by CONAMA, under Article 2 of Supreme Decree 95/2001?

Total watercourse erosion and entrainment with the Project operational
The watercourses affected by the project, which will be subject to a drop in transport of sediment in suspension into the Maipo River, are the Volcán, Yeso, and Colorado Rivers. The reduction in the value of solid streambed particle entrainment in the rivers is estimated at 0.05, 0.03, and 0.09 millions of tons per year. The total reduction associated with the project is of the order of 1 million tons per year, representing almost 30% of the predicted value for solid streambed particle entrainment in the Maipo River at Las Vertientes in the absence of the project. The predicted value for solid streambed particle entrainment in the Maipo area at Las Vertientes with the project operational, meanwhile, will be reduced by approximately 2.0 million tons. Adding together the predicted values for solid particle entrainment and suspension particle entrainment, for the situation with the project operational, one obtains a value of approximately 9.6 million tons per year, representing 78% of the value - 12.3 million tons per year - estimated for the situation without the project (that is, a reduction of 22%).

Question 3:

All of this is without having conducted studies in the San José de Maipo or Manzano areas. However, the total value for the sand production industry at El Manzano is known, as the study published by R.E.G. Ingenieros specifies a total of 3 million tons per year.

Subtracting the declared value of the PHAM from this real and serious value, the expected value for solid streambed particle entrainment in the Maipo area at Las Vertientes with the project operational, meanwhile, will be reduced by approximately 2.0 million tons. I am talking about 66.6% less total particle wear and entrainment (including streambed and suspension sedimentology).

Most sediments are transported not in suspension, but rather dragged along the streambed. Therefore, if you take 27.8 cubic meters of water sourced from the 4 streams emptying into the Volcán River, plus water captured from the Yeso River, this is equivalent to 5 times more at the level of San José del Maipo than at the start.

What I want to explain to you in simple terms... Imagine a snowball. If you set it rolling over the snow, it gets bigger in volume until it forms a very large ball. Well, water in the river is the same. The cubic meter that you capture in the Upper Volcán Basin, by the time it gets, for example, to San José de Maipo, is no longer equivalent to a cubic meter; instead, it is equivalent to five cubic meters, at least as it is now carrying rocks, gravel, and sand. This factor is a result of the friction or grinding of the larger rocks that strike against each other, making ever smaller rocks, then gravel, and finally sand. This cycle or mechanism functions if and only if the river has water in it. Do you understand the natural mechanism that underpins the natural law of a watercourse? A sand man like me, with a mechanized extraction technique that only extracts sand during the ice melt season, from November 21 to the first two weeks of February, with the time in December between Christmas and New Year being my most productive season.

Finally, the factor that plays a stabilizing role in the evolution of this watercourse is the natural sedimentation slope gradient, which is unique for each river course like the Maipo River, and forms itself naturally depending on the water flow rate during the flood season in the watercourse, solid streambed particle entrainment and streambed transport granulometry, also naturally forming a particular watercourse width depending on the same factors (Flow Dynamics Theory). In this way, alluvial watercourses naturally form their own stable slope gradient and width, such that total annual sedimentation load brought down to the valley from the high mountains finally reaches the sea, after additional grinding during transport. The slope gradient increases over time, just as the size of particle transported and the width increase as the flow speed in the watercourse declines.

It is this very stability that can be altered by artificial installations. This then leads to a new sedimentation equilibrium slope gradient, and this must therefore be subject to analysis by the PHAM. It is certain that such a "study" relies on very different principles to the documentation presented.

According to the information that you yourselves put forward in Annex 20.

Survey Campaign.

Four survey visits were conducted in the Cajón del Maipo study area - two in September, the third in October, and the final visit in November 2007. These survey studies visited the different stretches of watercourses of interest, running from the Volcán River near the site where the Project's intakes will be installed in the La Engorda Valley, through the Maipo River upstream of the mouth of the Volcán River, to the Yeso River, as well as the Las Vertientes area and the Colorado River between the Maitenes intake and the junction of that river with the Maipo River. Due to heavy snow drifts, during the month of September it was not possible to reach the area where the La Engorda Valley, Colina Stream, and Morado River intakes are to be sited - it was for this reason that it was necessary to make the fourth visit, in November. The October survey visit was conducted together with an external company that conducted topographic and bathymetric surveys in sites selected during previous field visits. The purpose of these field campaigns,

above and beyond gaining a perspective on the study area, was to define the areas where topographic and bathymetric surveys would be necessary, the locations of exploratory trenches, water sediment sampling, and measurements of surface granulometry.

Question 4:

Therefore, please do not talk about four views. There were only three, and you counted wrong because

if it had not been for the snow, as you yourselves admitted, you would not have visited the area in November.

In any event, measurements of this type must be taken between November and February. This is the season when the winter snows melt, and therefore it is at that time that the rivers carry the highest loads of suspended sediment, and studies to determine surface granulometry.

No studies exist regarding San José de Maipo. No records of sediment in suspension exist regarding San José de Maipo.

According to the study by R.E.G. Ingenieros. Mountain foothill sector, from km 190 to km 159: this stretch of the Maipo River, from the Yeso River to the San Carlos Channel Intake, features a narrow watercourse measuring around 100 m in width, well dug into the alluvial and colluvial terraces at the bottom of this mountain foothill valley. It has an average slope gradient of $i = 0.87\%$ formed from a series of whitewater rapids and slow-flowing pools, which exist as a result of massive colluvial blocks of over 5 tons located on the riverbed. Despite the impact of the landslides that occurred in 1987 and 1993, this stretch of the river has remained in the same course since 1979.

Total streambed erosion with the Project operational

Coarse sediment transport from the upper reaches of the Volcán River into the Maipo River currently occurs at a very low level, and this will suffer no significant variation under the project. Sediment transport into the Maipo River from the Yeso and Colorado Rivers will be affected by the project. Sediment transport into the Maipo River from the Yeso and Colorado Rivers will be affected by the project. Under the least favorable calculation model, a reduction of the order of 0.2 to 0.5 million tons per year can be expected in the predicted values for transport from Yeso River, and of the order of

1.4 to 1.8 tons per year in the expected values for transport from the Colorado River, such that the total reduction in expected values for solid streambed erosion in the Maipo area at Las Vertientes is of the order of 2 million tons per year, or equivalent to approximately 22% of the 8.9 million tons per year estimated under the situation without the project.

It then states... The project will not modify water flow rates downstream of the Independent Intake, and therefore the solid erosion capacity of this area will not be affected. If aggregates extraction rates in the area

Question 5:

Does it not strike you as correct for nobody to express an opinion that you or those who have conducted the studies have massaged the information, that is, they have distorted it only so as to favor what the PHAM proposes. For this to be a professional and serious calculation regarding the Maipo River at Las Vertientes, it should include transport of coarse sediment from the Volcán River, the Yeso River, the Maipo River itself, and the Colorado River. Given that strictly speaking it is these four rivers together that feed into the Maipo River in the area that you yourselves mention. This study was not conducted at San Alfonso, and even less at San José de Maipo - which is where it ought to have been conducted, as this is the site of the only sand decantation facility in the entire district of San José de Maipo, which was completed on September 26, 2000. It is at this point that you ought to have mentioned the input of coarse sediment from the Volcán River, the Yeso River, and the Maipo River itself Did you know that the DOH bases all of its responses to those in the sand extraction industry on an engineering study that the Ministry of Public Works River Works Department, adopting DGOP Resolution N° 776 dated October 23, 1997, and entered into records on November 07, 1997, assigned to R.E.G. Ingenieros?, Are you aware that this study was conducted in the most serious manner possible, as the Ministry of Public Works commissioned it to be conducted regarding the Maipo River and its tributaries as a source of aggregates to supply the Metropolitan Region, Region V, and Region VI?

The need for this study arose from an analysis of the unfavorable balance that exists comparing estimates for production from the Maipo River Basin and the growing demand that underpins the country's development.

The overexploitation of the watercourses would result in subsidence leading to the undermining of riverside infrastructure such as **Intakes**, channels, and bridges, among others. The specific objectives that establish the Terms of Reference are as follows:

- Analysis of the geological characteristics of the area, identifying the regions that are sources of aggregates and proposing methods to determine their production potential.
 - Preparation of a diagnostic model of aggregates extraction from the perspectives of technical, administrative, and economic considerations.
- Proposition of annual aggregates extraction rates for each stretch of the Maipo River and the tributaries in question, such as to ensure a sustainable extractive industry.
- Proposition of a control methodology and an oversight methodology for the extraction of aggregates.
- Analysis of the benefits of aggregates extraction from natural watercourses for each district, taking into account control measures and oversight financed by the municipal government in question or overexploited watercourses.

Question 6:

Do you consider it to be serious and professional to prejudice the economic activity of thousands of families, specifically including my own family, the family of a sand man, this being a PERMANENT source of employment in San José de Maipo for many families that depend on this activity; should such impacts be taken lightly? While a "study" speaks of data without having taken measurements at the control points that should have been recognized.

Table. Average monthly flow rates (cubic m/s) in the Maipo River at San Alfonso, situation without the project (Average)

APR	48.03
MAY	42.47
JUN	41.43
JUL	40.43

AUG
SEP

38.08
43.55

OCT	58.79
NOV	102.58
DEC	151.83
JAN	139.01
FEB	96.92
MAR	68.43
QMA	72,63

Table. Average monthly flow rates (cubic m/s) in the Maipo River at San Alfonso, situation with the project

APR	34.33
MAY	29.28
JUN	30.25
JUL	29.15
AUG	38.08
SEP	43.55
OCT	58.79
NOV	102.58
DEC	151.83
JAN	139.01
FEB	96.92
MAR	68.43
QMA	58.51

Summary of average monthly flow rates in meters/s Maipo River Valley; Source: R.E.G. Ingenieros

APR	45.01
MAY	41.59
JUN	39.68
JUL	36.95
AUG	36.03
SEP	41.16
OCT	61.65
NOV	112.05
DEC	159.69
JAN	143.74
FEB	100.89
MAR	66.29
YEAR	73.73

The areas that are sources of aggregates in the Maipo River Valley are:

- Olivares River.
- Colorado River.
- Barroso River.
- Maipo River.
- Yeso River.
- Clarillo River.

The analysis commissioned by the Ministry of Public Works concludes that, in the Maipo River at El Manzano, it was possible to determine the source of 90% of total aggregates production in the river basin, during the ice melt season (October to March).

For the period from April to September, the Maipo River at El Manzano transports between 30% and 40% of total aggregates production.

I conclude that the "study" presented in the PHAM EIS, in Annex 20, necessarily underestimates real values.

To extract aggregates from the Maipo River, in my case using a mechanized extraction system located above the average water level in the river, so as to avoid seepage from the water table during aggregates production. This depends absolutely on the river rising above the level of my property, carrying 120 cubic meters per second. This is the starting flow rate for it to be possible for me to extract aggregates.

Therefore, when you capture 27.8 cubic meters per second, my only source of income or economic activity disappears. I base this analysis solely on average flow rate information showing that the month of December will be the only month when I will be able to extract aggregates, truthfully only between Christmas and New Year, which is the period when the river carries 150 cubic meters per second on removal of abstracted flow.

In my particular case, what are the thoughts of the PHAM given that it directly affects my activities?

Ladies and gentlemen, you are perhaps all long standing employees of AES Gener, with one, two, ten, or fifteen years in your jobs. When you retire, are fired, or resign, the company will forget you, you are merely cogs in its machine.

My case is different. I am the owner of this property, I have invested years of work, years sacrificing time and my family to get ahead with this sand bank. Money spent implementing this project, which I began to develop in 1996. I defend what is mine, and what has certainly come at a cost to me and my family; I defend the land that I bought; I defend the only thing that I can leave to my children, my grandchildren, and perhaps my great-grandchildren. I defend the only livelihood in which I know how to WORK on what is mine.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them

into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4**

in Chapter 2 of the EIS.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.06 Sediment**

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum.**

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study** presented in **Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent

approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of river flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (AGU.06.01), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted.

It can be concluded that the Maipo River system can be managed such that, With the Project operational, present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them.

Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

AGU.06.03 Maipo River Sand Production

With regard to the extraction of aggregates in the Maipo River, during the operations phase of the PHAM, the Project will not modify current natural sediment (aggregates) transport dynamics occurring in the river.

In effect, under the natural dynamics, sediment transport takes place mainly in the months of November, December, and January, as a result of snow and ice melt in the high mountains, and it is during this season that variations in

flow rate in the Maipo River caused by the project stand at their lowest levels. The same behavior applies to winter season rises in river level.

It must be pointed out that the PHAM returns water to the Maipo River in the Las Lajas area, located upstream of the El Canelo zone, and therefore downstream of this point the river's flow dynamics with the project shall be identical to those currently observed.

It is of great importance to observe that currently, without the PHAM in operation, slightly downstream of the Las Vertientes area (in the La Obra stretch of the river), during certain times of the year flow rate in the Maipo River watercourse drops significantly, leaving the river bed dry, due to water abstraction at the following intakes: La Sirena Channel, San Carlos Channel, Independent Intake owned by Aguas Andinas, etc.

Average water abstraction flow rates attributable to the main drinking water and irrigation intakes, many of which also make use of hydroelectric power as a byproduct, but discounting the effects of existing hydroelectric plants on these channels that discharge directly into the intakes, amounts to 113 m³/second, which is equal to the average annual flow rate in the Maipo River at Las Vertientes. Depending on water availability, the annual abstraction rate at these intakes varies between 78 and 164 m³/second.

This situation clearly explains the high level of perturbation observed in the

behavior of the Maipo River watercourse downstream of Las Vertientes, where the riverbed is dry except during periods of increased water level and in unusually wet years.

Remark N° 206

Law 19300, General environmental base law, TITLE I, Article 2. "for all legal purposes it should be understood that"...

Environmental damage [is] any significant loss, decline, detriment, or harm caused to the environment, or to one or more of its components.

Environmental Impact Study: a document that provides point by point details of the characteristics of a project or activity that plans to implement modifications in the environment. It should provide documented background information that can be used to predict, identify, and interpret its environmental impact and describe the action or actions that it shall take in order to prevent or minimize all significant adverse effects.

Environmental impact: alteration of the environment, **directly or indirectly caused by a project or activity in a specific area.**

Reparation: the act of returning the environment, or one or more of its components, to a state similar to that in which it was to be found before damage caused, or, if this is not possible, the re-establishment of its basic properties.

Article 3: Notwithstanding the sanctions stipulated by law, any person or body that through action or gross negligence causes damage to the environment shall be obliged to make full material reparations, at its own expense, if possible, and to provide compensation as stipulated by law.

- Application of dust suppressant on Route G25 from Romeral to El Yeso 22 Km.
Route G455 from Romeral to Colina 21 Km. Application of bischofite solution (magnesium chloride).

In terms of characteristics, magnesium chloride hexahydrate, or bischofite, is a salt. It possesses a range of properties that permit its potential use as a chemical stabilizer in granular roadways: capacity to absorb and retain water from the surrounding environment, increases in water's surface tension, and reduction in water's vapor pressure. The addition of bischofite permits the creation of a stable roadway, reduces the formation of potholes, corrugation, loss of material, and dust emissions, while improving the driving experience.... **Inorganic stabilizers** include sodium chloride, magnesium chloride hexahydrate, calcium chloride, calcium sulfate, calcium carbonate, phosphoric acid and phosphates, and sodium hydroxide. Disadvantages of the usage of soil stabilizers. The usage of soil stabilizers is restricted by factors relating to soil type and climate conditions. For the soils found in our country, most stabilizers required the addition of fine-grain material, resulting in a disadvantage as against direct application with existing materials.

In terms of the disadvantages of bischofite agents, what is the effect of rainwater runoff from soil treated with bischofite when it makes contact with rivers, streams, springs, groundwater, meadows/wetlands, hot springs, and vegetation, or if animals drink this water after it has been in contact with magnesium chloride?

I request that, in responding to the issue of rainwater, you do not state that bischofite will be applied only in the summer to prevent dust, not in the winter. In the Cajón del Maipo area, it does not only rain during the winter. Rain also falls during the summer months of November, December, January, and February. We are talking about low and high mountain areas, at altitudes of 2000 to 2500 meters.

All of these are present in at least parts of the two stretches of road that will be treated with magnesium chloride.

What is the PM10 or inhalable particulate material? These are particles with diameter equal to or less than 10 microns (a micron is one thousandth of a millimeter). Due to its size, PM10 is capable of entering the human respiratory system. The smaller these particles are, the greater their potential harmfulness to human health. Particulate material can be subdivided into: Coarse fraction: 2.5 to 10 microns. Capable of entering the lungs. Fine fraction: smaller than 2.5 microns. Capable of entering the alveoli, and continuing into the bloodstream.

In the Project, the final value after applying proposed weighting factors, reach values greater than the permissible limit for the emission of inhalable particulate matter (10 tons per year) established by the Atmospheric Decontamination and Pollution Prevention Plan, for all years of Project development.

What will be the real PM10 value after the application of bischofite solution as proposed? Who will take responsibility for this? What will happen if PM10 emissions in the area do not drop below PM10?

- The PHAM, according to available hydrological background information, including a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, and current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself

ANNEX 10

Why does the study mention 50 years? What will happen after the end of this period - will a new study be conducted, will the number of cubic meters that you plan to abstract be increased?

- In terms of winter road clearing, in view of the high-altitude situation. Certain sections of these roads remain closed during the winter season due to landslides, heavy precipitation, and intense snowfall. Annex 2 of the project.

How will you prevent the entry of private individuals into these areas, where the road to El Yeso has always been closed, as road conditions make access impossible, and the department of National Goods segments this area into risk zones?

Route G25 and Route G455 with a width of 7 m, if and only if the 31 kilometers of new road, with a roadway width of 10 m - what is the cause of the 3 extra meters of width in existing roads, as this action has certainly been implemented by the highways department? If these are only to be service roads, they will therefore be closed to the general public (tourists, for example) at the end of the project operations phase. Direct quote from the project documentation... "Only the service roads in the El Yeso - Lo Encañado will have access restricted, barring use by non-project vehicles during the project's operations phase - 4.2 kilometers".

for trucks carrying 12 to 15 cubic meters, as stated in the project documentation. Given that in this area Route G25 is on a slope with no view on either side, running both from San José de Maipo and from Santiago. My question is as to whether the entrances and exits of properties adjacent to this route must comply with the regulations imposed by the Regional Highways Department, and at this precise point there is no space available for the creation of parallel entrances 100 before the main gate.

- Bearing in mind the difference between the use of water rights and water concessions.

I would like to ask what you are talking about in Annex 20 of the Project.

1. Summary and conclusions.

Project impact on the system's sedimentation equilibrium...

In view of the absence of integrated management plans for aggregates extraction activities in the Maipo River, annual extraction rates appear to stand at the very limit of the what is sustainable for the watercourse, as deduced for background information reviewed. In this scenario, any perturbation to the system could lead to local riverbed erosion problems, as has occurred in the past due to overextraction during certain periods. Therefore, if the predicted reductions in sediment availability downstream of the Independent Intake implemented by the project come to pass, then although these variations are relatively minor, they may lead to local problems if measures are not taken to ensure more rational management of the watercourse and available water and aggregates resources. This management should clearly be conducted addressing the river basin as a whole, implemented by the competent authority.

It must be born in mind that whether or not the project goes ahead, in the long term the effects of the dam on the El Yeso River will come to be felt, leading to a state of static shielding, preventing this watercourse from contributing any significant quantity of sediment. This results in an estimated reduction of between 0.2 and 0.5 million tons per year in riverbed erosion and entrainment, for the situation without the current project. It is hard to estimate when this effect will be observed, particularly bearing in mind that after 43 years of operation of the dam, there is as yet no significant evidence of the formation of static shielding.

Finally, it should be mentioned that the morphological conditions of the Maipo River at the point where it leaves the valley are a consequence of the natural reduction in its sediment transport capacity, leading to the deposition of a proportion of its sediment load and the formation of multiple watercourses and islands. In view of its characteristics, the Maipo River (and all of the rivers not subject to intervention, in general) is not

static, but rather continually evolving, in a dynamic equilibrium where in flow rate, sedimentation, and river morphology are permanently interacting and modifying each other. The rate at which the system changes may be altered (and accelerated) if it is perturbed in any way, moving towards new equilibrium situations. Thus, if sediment transport rates into the system are changed, or in the event of excessive extraction of aggregates from the river, water flow may eventually lead to degradation in certain parts of the river system. However, these effects may be reduced or controlled through suitable management of the system; such management must necessarily be based on integrated perspective, including the entire river system through to the river mouth. In this sense, it can easily be seen that at present no rational management

system is applied to the extraction of aggregates in the Maipo River System. When the competent authority grants extraction permits based on local criteria, it fails to take into account the reaction of the system, in both spatial and temporal terms, and movement towards a new equilibrium situation.

On what grounds does the competent authority take the decision to grant permits based on local criteria? Does this refer to the criteria applied by the Metropolitan Regional Highways Department, now the Hydraulic Works Department? Or the criteria applied by the Mayor of San José de Maipo? Or do the criteria applied by the Municipal Council take precedence? Or the criteria that should now be applied by CONAMA, under Article 2 of Supreme Decree 95/2001?

"Environmental impact: alteration of the environment, directly or indirectly caused by a project or activity in a specific area."

Based on the definition of a direct impact, my impact as a sand man, as defined in the previous paragraph.

Who will take responsibility for the domino effect that will result from reduced supply of aggregates only in the Metropolitan Region? Will this be a repeat of the Transantiago project, in which whatever resources are present are taken away? This battle will last for less time!

Have you thought of what will happen if less sand is produced?

...As the river will bring less sand, there will therefore be less supply on the market. What will happen is that the cost per cubic meter will increase. At least the construction industry in the Metropolitan Region has not stagnated, and continues to show an upward trend.

At what time will the company bring together a meeting of those directly affected by this project? At what time will the company bring together a meeting of the sand producers in the Maipo River Valley between Km 190 and Km 150? I ask you, at what time will time be given to talk to me, either by Felipe Naranjo or by Carlos Mathiesen, about my case? This should clearly be before August 27, which is the end date for the citizen participation process.

What was Ms. Patricia Alvarado talking about when, during the citizen participation process held in San Gabriel she said that the river will bring in 15% less, and that from our point of view we would see this as 10 centimeters less, in visual terms.

Has this lady thought about what she is saying? She is stating that the Maipo River has a depth of less than one (1) meter. To be precise, she is saying that the river has a depth of 66.6 centimeters.

I demand that you read what you yourselves as a company have written in the project documentation. To give an example, in an average year the Maipo River

at San Alfonso carries approximately 151.83 cubic meters per second during the month of December. With the project in operation, it will carry 133.10 cubic meters per second. In percentage terms we are talking about 100% and 87.66% of this when the river is carrying a smaller quantity of water, or in other words a 12.34% lower flow rate. However, for example in August, the river carries 38.08 cubic meters per second in the situation without the project. In the situation

with the project this drops to 28.30; in percentage terms we are talking about 100% and 74.31%, in other words a 25.69% drop in flow rate. So as not to sound extremist, let's just take the QMA situation without the project, 72.63 cubic meters per second. QMA situation with the project, 58.51 cubic meters. That is, 19.44% less
In my case, the aggregates extraction months are November, December, January, and February.

Average monthly flow rates (average over 50 years from 1952 to 2002) according to Annex 20 of the Alto Maipo EIS. Maipo River at San Alfonso

Flow rates	November	December	January	February	
Average QMA					
With the Project	91.03	133.10	115.76	76.54	58.51
Without the Project	102.58	151.83	139.01	96.92	72.63
Percentage drop in flow with the Project	11.26%	12.33%	16.73%	21.02%	19.44%

According to average monthly flow rate percentages for other months. It emerges that during the ice melt months, the percentage drop in flow rate with the project will not be so high, but in the months when the Maipo River at San Alfonso carries the lowest flow rate (August) the drop in flow rate with the project represents a much higher percentage.

What I want to say is that water abstraction by the PHAM should vary between the ice melt months and other months, in a directly proportional manner (higher percentage abstraction when flow rate is higher). But according to your own plans it will be INVERSELY PROPORTION (a higher percentage abstraction when flow rate is lower). This makes no sense.

Ladies and gentlemen, perhaps the way you look at things I am an uneducated man. I only got through to the tenth grade at school, my father died when I was three and my mother died when I was 15 years old. Everything that I know I have learned every day of my life. With the experience that I have gained every day that I have lived, I read everything that passes through my hands. Not being an engineer, I would never make a statement as irresponsible as what Madam Patricia said. Do not think of us as small town folk with no education, or as moderately intelligent people who will not be able to understand a simple mathematical ratio.

Have some respect. Even though I am not engineers like you, I could still teach you a lot - including "Don't say something that you don't know about or if you are not 100% informed". Regarding: the concentration of solids in suspension as measured in the study presented in the EIS, Annex 20.

Direct quote:

To suitably analyze Table 7.3 it would be necessary to know the flow rates in each watercourse on the day that the measurements are taken, which information is not available. However, some conclusions can be drawn regarding the data collected. First is the major increase in solids in suspension observed in November, as against September and October, as a result of snow melt. This also reflects the relatively smaller amount produced in the basins associated with the Volcán, Yeso, and Colorado Rivers.

Just one paragraph above, two things have been admitted. First, for a suitable analysis, they have issued a judgment without possessing all of the information. Secondly, the snow melt season is the period when this study really ought to have been conducted, taking samples of all types (flow rate, sediment, solids in suspension or Qss, solid streambed erosion, sediment buildup, granulometric sampling, and topographic, bathymetric, and hydrographic surveys) at a number of measurement points.

Solid streambed erosion is expected in the annex, in part 7.2.

The predicted annual solid suspension entrainment was determined based on prior information, the results of which are summarized in Table 7.1. Table 7.2 shows solid suspension entrainment measured in the Volcán River in 1990, together with routine measurements conducted on the same day at the Maipo River station at San Alfonso and the Colorado River station upstream of the confluence with the Maipo River. Records of the Volcán River at Queltehues cover only a period running up to July 1, 1985, and it is therefore not possible to compare entrainment rates for this station. Despite the limitations of making a comparison of streambed erosion based on a single measurement, this can give an idea of the proportions

of sediment contributed by each watercourse. In this way, the contribution of the Colina Stream to the Maipo River at San Alfonso amounts to approximately 1%, and the contribution of the Volcán River to the Maipo River, at the confluence with the Colina Stream, is around 7%. This value can be compared to the total expected annual contribution, which in this case is 10%.

How can you say that predicted solid streambed erosion at Queltehues is 0.14 if you only have one value, as you yourselves admit in the previous paragraph?

I must once again insist. My statement, made in my previous 9-page citizen participation. I expect serious and real technical responses to my questions. My need, and my real demand, is:

- **Commitment by Alto Maipo AES Gener made to me regarding the direct impact that I will suffer as a result of the project, as the only sand producer whose works have received final acceptance.**
- **Serious responses based on serious studies, without assumptions regarding my questions.**
- **Rigor in all commitments that the EIS says will be made in these fields, and that they be recognized as environmental impact, for instance in the case of PM10.**
- **Rigor in all commitments that the PHAM EIS ought to accept affecting private individuals, as in my own case, as Annex 20 of the EIS has not yet even admitted what impact we will suffer.**

- **Recognition of persons and families that directly depend on aggregates as part of the workforce. We are not talking about very bad, bad, or good wages. We are talking about PERMANENT jobs.**

- **What will happen to supply and demand for aggregates in the Metropolitan Region when the PHAM is operation, and who will absorb the indirect costs associated with the project.**
- **Should the PHAM's water abstraction, in accordance with its rights, not be directly proportional to river flow rate levels? (higher average monthly flow rate, more water abstracted).**

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds in-stream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

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tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

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For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

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AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned,

including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex**

17 of Addendum 1, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.06 Sediment**

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study** presented in **Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence. Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (**AGU.06.01**), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted.

It can be concluded that the Maipo River system can be managed such that, with the project operational, present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them.

Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

AGU.06.03 Maipo River Sand Production

With regard to the extraction of aggregates in the Maipo River, during the operations phase of the PHAM, the Project will not modify current natural sediment (aggregates) transport dynamics occurring in the river.

In effect, under the natural dynamics, sediment transport takes place mainly in the months of November, December, and January, as a result of snow and ice melt in the high mountains, and it is during this season that variations in flow rate in the Maipo River caused by the project stand at their lowest levels. The same behavior applies to winter season rises in river level.

It must be pointed out that the PHAM returns water to the Maipo River in the Las Lajas area, located upstream of the El Canelo zone, and therefore downstream of this point the river's flow dynamics with the project shall be

identical to those currently observed.

It is of great importance to observe that currently, without the PHAM in operation, slightly downstream of the Las Vertientes area (in the La Obra stretch of the river), during certain times of the year flow rate in the Maipo River watercourse drops

significantly, leaving the river bed dry, due to water abstraction at the following intakes: La Sirena Channel, San Carlos Channel, Independent Intake Owned by Aguas Andinas, etc.

Average water abstraction flow rates attributable to the main drinking water and irrigation intakes, many of which also make use of hydroelectric power as a byproduct, but discounting the effects of existing hydroelectric plants on these channels that discharge directly into the intakes, amounts to 113 m³/second, which is equal to the average annual flow rate in the Maipo River at Las Vertientes. Depending on water availability, the annual abstraction rate at these intakes varies between 78 and 164 m³/second.

This situation clearly explains the high level of perturbation observed in the behavior of the Maipo River watercourse downstream of Las Vertientes, where the riverbed is dry except during periods of increased water level and in unusually wet years.

It is for this reason that the Project Owner asserts that its activities will have no impact on the current situation in the sand extraction sites located on the Maipo River.

AGU.06.04 Discharge effects

Water capture in advance of in-situ gravel removal leads first to a reduction in sediment load in water carried through the headworks to the turbine rooms, while the solid materials that is retained is returned to the river. At the point where water is discharged from the plants (Las Lajas area), water that has passed through the turbines - which contains a certain quantity of sediment - once again mixes with the water in the rivers, returning to its original conditions in terms of average sediment load (**Addendum, Section I, Question 28**).

At the point where water is returned to the Maipo River, in the Las Lajas area, there will be no degradation of the riverbed as it is composed entirely of rocks. It should be mentioned that the flow rate discharged from the PHAM at this point is always lower than the flow rate in the Maipo River just upstream.

During the operations phase of the Project, planned maintenance activities do not include any cleaning of tunnels and culverts. Inside the tunnels, the cross sectional area for water flow is small enough to prevent sedimentation. This is shown through the operation of the Alfalfa Plant for 20 years without any cleaning of the tunnels being included among maintenance activities.

The only operations that lead to the discharge of sediment are the discharge of gravel traps at the inlets, and the flushing of the sand traps, returning sediment to the river once a certain volume has built up within them. These operations are conducted intermittently and for short time periods (1 minute for sand traps, 10 minutes for gravel traps), at variable frequency depending on the season. For more information see the **Addendum, Section IV, Question 3**.

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

SLD Health Impact

The Project owner shall take responsibility for ensuring compliance with health and safety regulations, in order to prevent any possible risk to health and physical integrity for the inhabitants of San José Maipo as well as the persons working on the Project.

SLD.02 Atmospheric

Although the Project involves surface construction activities, which will lead to the emission of particulate matter, plans call for the implementation of a suite of mitigation measures that will result in a considerable reduction in emission, not only of the PHAM itself but also as against the baseline of current particulate emissions throughout the Project's area of influence. In addition to the above, these considerations should be evaluated bearing in mind the fact that most of the Project's works will be underground, not producing any emissions of particulate matter.

Conversely, given that most of the Project's works are to be located in high mountain areas, it can be stated that the prevailing ventilation conditions in this environment will facilitate the dispersion of dust, with a natural reduction in emissions during the winter season as a result of the additional moisture contributed by rain and snow precipitation.

For more information on emissions compensation measures, see **Annex 5 of the EIS**.

SLD.02.01 Pollutants

The Project's atmospheric emissions will correspond to dust suspended in the air as a result of earth moving activities (during excavations, loading and unloading, etc.), and the movement of vehicles at surface work areas. Emissions control will be conducted by means of:

- conservation of existing roads currently used by mine trucks,
- all new roads built will be treated with bischofite. Additional information provided in Section I, Question 42 and Section VI, Question 17, in the Addendum.
- use of tarpaulins covering truck loads,
- timely mechanical maintenance of equipment, machinery, and vehicles, and wetting of dusty surfaces

- use of wagons and belt conveyors for the removal of muck

Remark N° 207

Dear Sirs:

I am writing to you in my capacity as chairperson of the El Manzano Channel Irrigation Water Community in order to request that you bear in mind our requirements regarding the **Alto Maipo Project Environmental Impact Study presented by Gener**.

If you read the project documentation presented to CONAMA on May 22, you will see that its information on the project baseline, and the section on identification, prediction, and evaluation of environmental impacts to be generated in our area, are not mentioned - particularly with regard to our irrigation system. Similarly, it fails to address mitigation, much less establishing commitments to solve our problem, or compensation to which our community will have a right if it is affected.

Description of the problem: Our water abstraction system is located in the Colorado River at the 967 meter elevation level, and its structures were built in accordance with the regulations issued by the Directorate General of Water, to capture water from a natural overflow with a minimum height of 0.75 m in the water of the river. The PHAM plans to capture the water of the Colorado River in the Maitenes area, leaving the river with only an ecological flow rate of 0.7 m³/s (defined by the PHAM), plus our rights and the rights of other irrigation users such as the Maurino Channel. Under this situation it will become absolutely impossible for our intake to capture our water rights without the construction of new installations that permit this abstraction.

As an irrigation user community, we consider that **the construction costs pertaining to these works, and the maintenance costs accrued whenever they suffer any degree of total or partial destruction that prevents us from capturing the water over which we hold rights, should be payable in their entirety by the company that generates this impact**, and not the members of our community.

Thematic responses

Specific response

The Project Owner reiterates its commitment to ensuring that necessary infrastructure exists in the river to permit water to enter the channels at all times, in accordance with the rights granted and the availability of the river throughout the life of the PHAM project.

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see **Table 2.3.4** in **Chapter 2 of the EIS**.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that is, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 **“Hanging”** **channels**

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

Remark N° 213

Real Available Water Resources

Baseline studies to define ecological flow rates, taking into account the geology, local soil studies, and impact on flora and fauna, would certainly arrive at much lower figures for real available water resources than those presented in project documentation - what is the real amount of energy that this project can generate?

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS**.

This section presents information characterizing the basins and tributaries of the Volcán, Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex 13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS**.

AGU.03.02 Geology

The baseline studies used in determining the geological characteristics of the Project area are presented in **Section 5.3.6 of the EIS**. Additionally, the **hydro-geological baseline studies** for the Project area are presented in **Section 5.3.5.3 of the EIS**. Complementary information is also provided in **Annex 45 of the EIS**.

Both of these studies start with general background information on the area where the Project is to be installed, going on to present a detailed description of the geological and geomorphological characteristics of specific areas where Project works or activities are planned.

Complementary information is provided in **Annex 8 of the Addendum**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different

sections of these rivers. These Qe zones are defined

in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neoporteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Lilolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant

level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

Remark N° 214 Riverbed Erosion

The lack of water flow will bring about the degradation of the aggregates that form the beds of the rivers and streams that flow together to form the "Maipo", which will aggravate existing problems in bringing pilings, such as the case of the "Los Morros Bridge".

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate time series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study** presented in **Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (**AGU.06.01**), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted.

It can be concluded that the Maipo River system can be managed such that, With the Project operational , present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them.

Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

AGU.06.03 Maipo River Sand Production

With regard to the extraction of aggregates in the Maipo River, during the operations phase of the PHAM, the Project will not modify current natural sediment (aggregates) transport dynamics occurring in the river.

In effect, under the natural dynamics, sediment transport takes place mainly in the months of November, December, and January, as a result of snow and ice melt in the high mountains, and it is during this season that variations in

flow rate in the Maipo River caused by the project stand at their lowest levels. The same behavior applies to winter season rises in river level.

It must be pointed out that the PHAM returns water to the Maipo River in the Las Lajas area, located upstream of the El Canelo zone, and therefore downstream of this point the river's flow dynamics with the project shall be identical to those currently observed.

It is of great importance to observe that currently, without the PHAM in operation, slightly downstream of the Las Vertientes area (in the La Obra stretch of the river), during certain times of the year flow rate in the Maipo River watercourse drops significantly, leaving the river bed dry, due to water abstraction at the following intakes: La Sirena Channel, San Carlos Channel, Independent Intake owned by Aguas Andinas, etc.

Average water abstraction flow rates attributable to the main drinking water and irrigation intakes, many of which also make use of hydroelectric power as a byproduct, but discounting the effects of existing hydroelectric plants on these channels that discharge directly into the intakes, amounts to 113 m³/second, which is equal to the average annual flow rate in the Maipo River at Las Vertientes. Depending on water availability, the annual abstraction rate at these intakes varies between 78 and 164 m³/second.

This situation clearly explains the high level of perturbation observed in the behavior of the Maipo River watercourse downstream of Las Vertientes, where the riverbed is dry except during periods of increased water level and in unusually wet years.

It is for this reason that the Project Owner asserts that its activities will have no impact on the current situation in the sand extraction sites located on the Maipo River.

AGU.06.04 Discharge effects

Water capture in advance of in-situ gravel removal leads first to a reduction in sediment load in water carried through the headworks to the turbine rooms, while the solid materials that is retained is returned to the river. At the point where water is discharged from the plants (Las Lajas area), water that has passed through the turbines - which contains a certain quantity of sediment - once again mixes with the water in the rivers, returning to its original conditions in terms of average sediment load (**Addendum, Section I, Question 28**).

At the point where water is returned to the Maipo River, in the Las Lajas area, there will be no degradation of the riverbed as it is composed entirely of rocks. It should be mentioned that the flow rate discharged from the PHAM at this point is always lower than the flow rate in the Maipo River just upstream.

During the operations phase of the Project, planned maintenance activities do not include any cleaning of tunnels and culverts. Inside the tunnels, the cross sectional area for water flow is small enough to prevent sedimentation. This is shown through the operation of the Alfalfa Plant for 20 years without any cleaning of the tunnels being included among maintenance activities.

The only operations that lead to the discharge of sediment are the discharge of gravel traps at the inlets, and the flushing of the sand traps, returning sediment to the river once a certain volume has built up within them. These operations are conducted intermittently and for short time periods (1 minute for sand traps, 10 minutes for gravel traps), at variable frequency depending on the season. For more information see the **Addendum, Section IV, Question 3**.

Remark N° 215 Riverbed Erosion

This will further exacerbate existing damage in the intakes of the channels, which are currently suspended for this very reason, without reaching their objective of connecting to the water flowing through the river.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (**AGU.06.01**), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted.

It can be concluded that the Maipo River system can be managed such that, With the Project operational , present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them.

Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

Remark N° 223 Upper Maipo Basin Area Usage Flow Rate

The project plans establish a total water abstraction rate in the Upper Maipo Basin area of 27 m³/s. The question is: will the management of the El Yeso Reservoir cause any intervention?

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

AGU.05 Drinking water supply

Construction works and/or activities involved in the project (roads, movement of materials, transport of different products, etc) shall have no effect or impact whatsoever on the quality or security/safety of water supply in the Maipo River system. During the construction phase, Project interventions affecting watercourses shall cause only temporary effects resulting from Earth moving during excavation and other construction activities. This intervention shall affect small areas over short time periods, as it shall last only during the period while these installations are under construction (see **Section 6.4.1.4 of the EIS and Section VII, Question 17, in the Addendum**).

During operations, the PHAM shall not affect the Laguna Negra-Lo Encañado and El Yeso Reservoir system, which is managed by the company Aguas Andinas S.A, in its capacity as holder of the drinking water concession for Santiago; nor shall the Project affect the operational dynamics of the drinking water supply system. Therefore, the implementation of the PHAM does not imply any impact whatsoever on the supply of drinking water (see **Section I, responses 27 and 29, in the Addendum**).

Furthermore, the water abstracted by the Project shall be returned to the river 5 km upstream of the Toma Independiente or Independent Intake, operated by the company Aguas Andinas S.A., which abstracts water for drinking water supply to the city of Santiago; therefore, the PHAM shall not affect normal operations of this system. The PHAM shall only affect the delivery point of water in the tributaries of the Maipo River; in other words, water that currently does not drain into the Maipo River shall not be incorporated into that river's total flow.

However, in the event that an incident may arise as a result of an accident during construction, such as accidental spillages or rock falls, the procedures described in the Contingency Plan shall be implemented, consisting of a suite of actions to solve associated problems. This plan is explained in detail in **Chapter 7 of the EIS, Section 7.2.5**.

Remark N° 224 Death of the Lung of Santiago

We live in a heavily polluted metropolis, particularly during the winter. Our escape is to visit the Cajón del Maipo Valley on weekends. A decline in water flow rates will affect the valley's green areas, and the possibility of breathing clean air just 30 minutes from the city.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

SLD Health Impact

The Project owner shall take responsibility for ensuring compliance with health and safety regulations, in order to prevent any possible risk to health and physical integrity for the inhabitants of San José Maipo as well as the persons working on the Project.

SLD.02 Atmospheric

Although the Project involves surface construction activities, which will lead to the emission of particulate matter, plans call for the implementation of a suite of mitigation measures that will result in a considerable reduction in emission, not only of the PHAM itself but also as against the baseline of current particulate emissions through the Project's area of influence. In addition to the above, these considerations should be evaluated bearing in mind the fact that most of the Project's works will be underground, not producing any emissions of particulate matter.

Conversely, given that most of the Project's works are to be located in high mountain areas, it can be stated that the prevailing ventilation conditions in this environment will facilitate the dispersion of dust, with a natural reduction in emissions during the winter season as a result of the additional moisture contributed by rain and snow precipitation.

For more information on emissions compensation measures, see **Annex 5 of the EIS.**

SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS.** Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1.** In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and

prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

SUE.02 Soils, meadows, and wetlands

The Project Owner has conducted a number of studies with the aim of characterizing the vegetation of summer grazing areas (La Engorda) (see details in Addendum 1, Annex 6, and in Chapter 5 of the EIS), as well as flora and vegetation studies in the Project's area of influence (EIS, Chapter 5).

These studies contain information compiled in fieldwork campaigns conducted in Fall 2005, Spring 2006, November 2007, March 15 and 16, 2008, and September 2008, which add to the body of knowledge available regarding vegetation in these areas.

The Lo Encañado area shall be assigned a status of controlled access area for works contractors at all times: it shall not be subject to any intervention whatsoever. For more information on vegetation areas that could be affected by the construction works, and to learn about mitigation measures proposed by the Project Owner, you are advised to review Annex 42 of the EIS and Annex 6 of the Addendum.

With regard to environmental regulations that apply specifically to vegetation and plant life, the Project Owner shall be subject to:

Supreme Decree 366 (Exploitation of Tamarugo, Carob, Chañar, Guayacán, Aextoxicon, Charcoal, Acacia, Boldo, Maiten, Litre, Bollen, and Quillay). This legal instrument governs the felling of trees and bushes.

Supreme Decree 4363 and D.L 701 (Approving the Definitive Text of the Law on Woodland and Regulations on Forest Promotion).

Article 2 of the Woodland Law establishes an obligation that land classified as for preferential woodland land use, as well as natural and artificial woodlands, are subject to woodland management plans approved by the National Forestry Commission (CONAF). Furthermore, Article 21 of Decree Law 701 establishes that any felling or usage of native woodland shall be subject to the CONAF's prior approval of the corresponding management plan.

Decree 82 (Prohibiting the Felling of Trees and Bushes in Indicated Andean High Mountain and Foothill Areas)

Article 102 Sector Environmental Permit (Permit for the felling or exploitation of native woodland, in any type of land, or plantations located in land with preferential characteristics for woodland use).

For further information and analysis on the aforementioned regulations and permits, as applicable to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see Sections 3.2.6 and 3.3.7 in Chapter 3 of the EIS.

Remark N° 225 Disappearance of Native Species

Native trees (Avellano and Maitén) use their roots to absorb deep underground water during times of drought. The reduced flow rate in the rivers will cause the disappearance of these species. Less than 10 years ago we experienced a drought that lasted almost 5 years. This event almost wiped out the Maitén trees in the area, while the Quillay trees survived thanks to their deep roots, and the existence of rivers and aquifers.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03.03 Underground water

Underground water will not be affected in any way by the operation of the Project. This is the case because the underground water flow capacity in each sector of the aquifer associated with the Maipo River is much lower than the minimum flow running through each section of the river, and therefore under all circumstances the aquifers shall remain saturated. Thus, underground water sources present in the area shall also not be affected.

The PHAM plans to construct 70 km of tunnels, of which approximately 50 km correspond to headworks or hydraulic pressure tunnels, the remainder being access tunnels for use during construction of the project and for subsequent operation of the power plants (see **EIS Chapter 5, Section 5.3.5.3**).

Most of these tunnels have been designed to operate at variable internal pressures, with a maximum achieved at certain points of a little more than 450 m. The design requirement for these tunnels is that the lower limit of principal compression in the surrounding rock medium is always less than the operating pressure, such as to maintain a sufficient safety margin to prevent alterations in natural permeability dynamics through hidrojacking. In areas where this design principle is not guaranteed, the Project plans to install impermeable tunnel linings (**EIS, Annex 45.4**).

During the excavation of these tunnels, it is possible that the work front may have to pass through permeable rock strata - leading to seepages of water into the tunnel, the magnitude of which will depend on the permeability of the rock, the depth of the tunnel, and the level of the water table. In some areas, tunnel wall treatments may have to be applied in order to prevent water transfer into or out of the headworks tunnels.

The Project does not plan to make use of any water seepages that may arise, in the generation of electricity. Additionally, the overarching design principles underpinning the Project are oriented towards limiting seepages during construction, in order to establish suitable conditions for efficient tunnel excavation activities. The same principle applies to methods to limit the infiltration of water from the tunnels into the rock mass, thus avoiding water loss during operations.

Additionally, these procedures guarantee that any groundwater that may intercept the tunnels shall suffer no change in its natural hydrological dynamics, or impact on any foreign components or water other than the water entering the system (**EIS, Annex 45**). Special attention will be paid to the quality and characteristics of any water that may eventually return to the natural water system through the tunnel access windows, and therefore construction contracts will specify measurements that must be made and the treatment that shall be required for subsequent disposal of such water, in order to ensure compliance with the quality requirements for water discharge into natural watercourses, under regulations currently in force.

In the event of seepages of water at high temperature and possible acidic composition, it is important to make clear that in general there shall be no major differences in the methods used to render the tunnel walls impermeable. During all site surveys conducted, research boreholes and surface geological maps produced to date applying to the areas through which the tunnels will pass, no evidence whatsoever has been found to lead to any prediction of the presence of water at high temperatures, or with mineral or acidic contamination. As additional background information, during the construction of the Alfalfa Plant - with the excavation of 35 km of tunnels - no events similar to those indicated above occurred. Notwithstanding the above, the specification establish that, in locations located close to potentially critical areas, the contractor must drill survey boreholes of between 25 m and 30 m in length ahead of the tunnel work front, in order to gain early warning of seepage problems and thus be able to apply impermeable tunnel wall treatments as required. See **EIS, Annex 45.4**.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights

held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempeo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum.**

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neoporteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Lilolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4.**

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as

construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

F&F.02.02 Mitigation

Aquatic flora and fauna

The Project calls for a suite of multi-purpose environmental management measures that aim to minimize its effects on living organisms, including: minimization of watercourse areas to be subject to intervention by prioritizing such works for late summer and early fall seasons (period of lowest flow rates), the adoption of special precautions to prevent accidental spillages into watercourses (prohibition of the storage of lubricant drums in or near watercourses, etc), and permanent maintenance of ecological flow rates.

For more detailed information, including technical documentation that complements the information described above, see Annex 17 of the Addendum.

Terrestrial Flora and Vegetation

In order to prevent and/or minimize the Project's effects on plant life, it plans to adopt a number of integrative measures: micro-routing in advance of starting work on-site, in order to identify specimens of plants listed in any conservation category and subject to impact; compensation with the planting of 10 specimens for every one destroyed, in the case of non-woodland species listed for conservation; implementation of a woodland management plan applicable to woodland areas, which describes its measures in accordance with Article 5 of the Woodland Law; implementation of vegetation restoration plans at muck disposal sites, encampments, artificial slopes, and tunnel access terraces (EIS, Annexes 7 and 29). More in-depth information on complementary measures is provided in Annex 6 of Addendum 1.

Terrestrial fauna

Specific wildlife environmental management measures have been proposed for each particular species, taking into account prior experience in the success of these measures in similar projects. These measures will be implemented in continual coordination with the Servicio Agrícola y Ganadero. Principal measures include: capture of individuals belonging to species of conservation interest for rescue and relocation; controlled perturbation actions; and habitat replacement. Other measures are based on the use of signage, training for Contractors, and contractual requirements for on-site supervision (see details in Section 6.4.1.6 of the EIS).

See Annex 4 of the Addendum for the native wildlife rescue and relocation plan.

Remark N° 226 Tourism in the Area

Tourism in the area provides employment for local residents. Lack of water due to reduction in rivers' flow rates will reduce the area's attractiveness. The employment that AES offers for residents of the valley is short term (perhaps 5 years?)

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at

least in part.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **SOC Socio-Economic Impact**

Job creation plans for the district will take into account the concerns expressed by

community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.01 Jobs in the District

Local labor availability is estimated based on figures from the Labor Brokerage and Information Office. This information will be made available to construction contractors so that they can preferentially hire local workers. According to information compiled at the Project Office in San José de Maipo, the project has registered a total of 980 potential project workers, of whom 390 are unemployed, broken down as follows:

Mine workers:	105
Carpenters, Builders, and Rebar Layers:	157
Heavy Machinery Operators:	131
Non-specialized day laborers:	39
Drivers:	87
Specialized technical personnel:	60
Welders:	26
Foremen and supervisors:	7
Graduate professionals:	20
Cleaning, security, and canteen workers:	120
Administrative personnel:	91
Other, misc.:	139

The average project workforce during the construction phase (5 years) is estimated at 2000 persons, and during the Citizen Participation process the company has agreed to ensure that an average of at least 500 local persons will be on the payroll during the construction of the Project.

SOC.01.01 Requirements

In view of the characteristics and scale of the Project, personnel with specific qualifications will be required for the operation and maintenance of plant machinery and equipment, during the operations phase. Conversely, during the Project Construction Phase, it is projected that labor requirements will create jobs not only for mining workers, but also for machinery operators, drivers, and both skilled and unskilled construction personnel, the latter working mainly as day laborers and assistants.

The population of the Project's area of direct influence has been found to possess levels of training and specialization (occupation as defined under the CIIU code) that shall permit them to access both skilled and unskilled work positions created by the Project.

SOC.01.02 Working conditions

To date no schedule exists specifying labor requirements for the full duration of the construction phase. Detailed information specifying jobs created under average and peak labor requirements, broken down by labor requirement dynamics for each encampment, will only be available once the Project Owner has tendered the works contracts.

During the operations phase, it is expected that personnel requirements will amount to approximately 80 positions available, required for power plant operations and maintenance activities. Unlike work positions created during the construction phase, the jobs created in the operations phase will be permanent (EIS, Chapter 6, Section 6.4.2.4).

The Project Owner will provide for coordination between the construction works contractors, the Labor Brokerage Office, and the Municipality of San José de Maipo, regarding local labor required and jobs sought. The PHAM has accepted a commitment to incentivize works contractors to prioritize local contracting of labor required.

No prior training is planned in advance of the Construction Phase. However, such training will form part of the programs implemented in the more advanced phases of the project.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. In parallel, the study investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works,

in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán. For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02

Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 227 Ecological flow rates

I believe that the ecological flow rates set by AES in the project documentation are totally insufficient to guarantee adequate irrigation for the valleys.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that

will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

SUE.02 Soils, meadows, and wetlands

The Project Owner has conducted a number of studies with the aim of characterizing the vegetation of summer grazing areas (La Engorda) (see details in Addendum 1, Annex 6, and in Chapter 5 of the EIS), as well as flora and vegetation studies in the Project's area of influence (EIS, Chapter 5).

These studies contain information compiled in fieldwork campaigns conducted in Fall 2005, Spring 2006, November 2007, March 15 and 16, 2008, and September 2008, which add to the body of knowledge available regarding vegetation in these areas.

The Lo Encañado area shall be assigned a status of controlled access area for works contractors at all times: it shall not be subject to any intervention whatsoever. For more information on vegetation areas that could be affected by the construction works, and to learn about mitigation measures proposed by the Project Owner, you are advised to review Annex 42 of the EIS and Annex 6 of the Addendum.

With regard to environmental regulations that apply specifically to vegetation and plant life, the Project Owner shall be subject to:

Supreme Decree 366 (Exploitation of Tamarugo, Carob, Chañar, Guayacán, Aextoxicon, Charcoal, Acacia, Bolfo, Maiten, Litre, Bollen, and Quillay). This legal instrument governs the felling of trees and bushes.

Supreme Decree 4363 and D.L 701 (Approving the Definitive Text of the Law on Woodland and Regulations on Forest Promotion).

Article 2 of the Woodland Law establishes an obligation that land classified as for preferential woodland land use, as well as natural and artificial woodlands, are subject to woodland management plans approved by the National Forestry Commission (CONAF). Furthermore, Article 21 of Decree Law 701 establishes that any felling or usage of native woodland shall be subject to the CONAF's prior approval of the corresponding management plan.

Decree 82 (Prohibiting the Felling of Trees and Bushes in Indicated Andean High Mountain and Foothill Areas)

Article 102 Sector Environmental Permit (Permit for the felling or exploitation of native woodland, in any type of land, or plantations located in land with preferential characteristics for woodland use).

For further information and analysis on the aforementioned regulations and permits, as applicable to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see Sections 3.2.6 and 3.3.7 in Chapter 3 of the EIS.

Remark N° 228 Water Law

It is against the law to remove water from one river basin and return it in another, which is what this project proposes.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT

-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

Remark N° 229 Desertification

The chronic lack of water in the Volcán, Yeso, and Colorado Valleys will lead to the desertification of the Upper Maipo area.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

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SUE Soil Impact

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In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

SUE.02 Soils, meadows, and wetlands

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Decree 82 (Prohibiting the Felling of Trees and Bushes in Indicated Andean High Mountain and Foothill Areas)

Article 102 Sector Environmental Permit (Permit for the felling or exploitation of native woodland, in any type of land, or plantations located in land with preferential characteristics for woodland use).

For further information and analysis on the aforementioned regulations and permits, as applicable to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see Sections 3.2.6 and 3.3.7 in Chapter 3 of the EIS.

Remark N° 230 Tourism

Tourism is a major source of income for many persons in the Cajón del Maipo Valley. Changes caused by this project will convert the valley into a place that is very unattractive for tourism.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

**CAL.04 Fostering tourism
in the area**

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **SOC Socio-Economic Impact**

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. In parallel, the study investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 231 Drinking Water and Irrigation Water

The Project represents a threat to the availability of water for residents of Santiago, and will also lead to under-supply of water for irrigation.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

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AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see **Table 2.3.4** in **Chapter 2 of the EIS**.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**).

AGU.05 Drinking water supply

Construction works and/or activities involved in the project (roads, movement of materials, transport of different products, etc) shall have no effect or impact whatsoever on the quality or security/safety of water supply in the Maipo River system. During the construction phase, Project interventions affecting watercourses shall cause only temporary effects resulting from Earth moving during excavation and other construction activities. This intervention shall affect small areas over short time periods, as it shall last only during the period while these installations are under construction (see **Section 6.4.1.4 of the EIS and Section VII, Question 17, in the Addendum**).

During operations, the PHAM shall not affect the Laguna Negra-Lo Encañado and El Yeso Reservoir system, which is managed by the company Aguas Andinas S.A, in its capacity as holder of the drinking water concession for Santiago; nor shall the Project affect the operational dynamics of the drinking water supply system. Therefore, the implementation of the PHAM does not imply any impact whatsoever on the supply of drinking water (see **Section I, responses 27 and 29, in the Addendum**).

Furthermore, the water abstracted by the Project shall be returned to the river 5 km upstream of

the
Toma Independiente or Independent Intake, operated by the company Aguas Andinas S.A.,
which abstracts water for

drinking water supply to the city of Santiago; therefore, the PHAM shall not affect normal operations of this system. The PHAM shall only affect the delivery point of water in the tributaries of the Maipo River; in other words, water that currently does not drain into the Maipo River shall not be incorporated into that river's total flow.

However, in the event that an incident may arise as a result of an accident during construction, such as accidental spillages or rock falls, the procedures described in the Contingency Plan shall be implemented, consisting of a suite of actions to solve associated problems. This plan is explained in detail in **Chapter 7 of the EIS, Section 7.2.5**.

AGU.05.01 **Drinking water quality**

The process of hydroelectric power generation does not affect the physical/chemical qualities of water. Additionally, the PHAM does not plan to implement regulation installations that retain sediment. Thirdly, downstream of the discharge point the natural river conditions are maintained with regard to flow rate and physical/chemical properties.

During the construction of installations to be located in watercourses, the free-flowing course of the river is maintained through the construction of diversions through pipes laid along the river course for such purposes, or through channels that divert all flow, allowing free water circulation with no effect whatsoever on quality (see **Section I, Question 28, in the Addendum**).

The Project owner shall not make use of the Lo Encañado Lake or water usage rights owned by Aguas Andinas S.A. for this Project, instead opting to forgo usage of these resources and to replace the role that would have been fulfilled by the Lo Encañado Lake with a forebay located on a widening of the Alfalfal II plant headworks, located in the Alto Aucayes area on the Colorado River Valley (for details, see **EIS 2.2.1**). The Lo Encañado area shall be assigned a status of controlled access area at all times: it shall not be subject to any intervention whatsoever.

The Project Owner has made available a Water Quality Monitoring Program, with specifications for application during both the construction and operations phases. This program espouses a commitment to verify the effectiveness of environmental control measures designed to minimize the effects of works construction activities during the construction phase.

For further information on the Monitoring Program, see **Sections 8.2 and 8.3** in **Chapter 8 of the EIS**.

Remark N° 232 Water Availability

Calculations on water availability are based on elevated values that do not take into account exposure to periods of drought or the phenomenon of global warming.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of

the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists

of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses. Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Northing	Easting
	Alto Volcán		
	406,157	Stream gauge station	6,259,100
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 233 Project

There are no grounds for this project, it carries a high level of environmental impact, and it is not technically feasible.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS**.

This section presents information characterizing the basins and tributaries of the Volcán, Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex

13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS**.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS,**

Chapter 7), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment. The Project will feature a very low percentage of surface works, none of which is

located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3**, and **Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neoporteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation

that are not included in the woodland management plan are covered in the revegetation

plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Liolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly

frequented, minimizing their visual impact.

SLD.02 Atmospheric

Although the Project involves surface construction activities, which will lead to the emission of particulate matter, plans call for the implementation of a suite of mitigation measures that will result in a considerable reduction in emission, not only of the PHAM itself but also as against the baseline of current particulate emissions through the Project's area of influence. In addition to the above, these considerations should be evaluated bearing in mind the fact that most of the Project's works will be underground, not producing any emissions of particulate matter.

Conversely, given that most of the Project's works are to be located in high mountain areas, it can be stated that the prevailing ventilation conditions in this environment will facilitate the dispersion of dust, with a natural reduction in emissions during the winter season as a result of the additional moisture contributed by rain and snow precipitation.

For more information on emissions compensation measures, see **Annex**

5 of the EIS.

SLD.03 Acoustic

In the field of Environmental Impact, specifically acoustic impact, the Project Owner has conducted a wide-ranging study to estimate acoustic emissions generated during the construction of the PHAM. For more information on the acoustic impact of the PHAM, and methodologies, modeling techniques, and actions to be taken to minimize such impact, please see **Annex 30 of the EIS** and **Section II, Question 8 in the Addendum**.

Plans for blasting activities, specifically including the frequency, quantity, timing, and work periods of blasting, will be determined on site in accordance with the characteristics of each works activity and work site. Regarding works activity scheduling, priority will be placed on completion of surface works during the daytime (8:00-21:00 hrs.); for blasting activities, plans call for an information program at the time of the activity, defining and clarifying the periods when noise-producing activities will take place, in order to integrate the community into efforts towards the completion of the Project.

Another point worthy of emphasis is that the work sites (tunnel excavation, access windows, and entrances/exits) will not be sited close to settlements, thus preventing most of the potential acoustic impact that could be caused by the PHAM.

Wildlife rescue will be conducted through animal rescue activities based on the trapping of reptiles and amphibians before explosives are used, before service tracks are built, and before the modification of river flow.

Finally, and in order to comply with the requirements set forth above, the Project Owner shall be subject to:

1. Supreme Decree 146 (Establishing Standards on the Emission of Nuisance Noise Generated by Fixed Sources) establishing maximum permissible sound pressure levels, corrected according to technical criteria to evaluate and classify nuisance noises generated by fixed sources affecting the community, such as industrial, commercial, leisure, and artistic activities.
2. Exempt Decree 130 (Establishing restrictions on the movement of cargo trucks). The movement of trucks larger than 4 tons will be suspended from 14:00 hours on Saturdays through to midnight on each Sunday night on Route G-25 and Route G-421.

For more information on the acoustic impact of the PHAM, and regulations (Chapter 6 of the EIS), mitigation measures, methodologies, modeling techniques, and actions to be taken to minimize such impact, please see Annex 30 of the EIS, as mentioned above.

Finally, in order to verify the effectiveness of the mitigation measures taken, noise monitoring will be conducted at 8 sensitive points, following the procedure established in MINSEGPRES Supreme Decree 146/97, in order to verify compliance with the maximum permitted limits for sound pressure level (see details in **Chapter 8 of the EIS, Section 8.2.2**).

SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

TUR.03 Visual impact

The Project Owner has conducted a study to characterize the landscape of the area in which the

Project is to be located, taking into account esthetic and perceptual considerations and

emphasizing the characterization and appraisal of the issues of visibility, quality, and visual fragility of the landscape. In terms of Landscape Alteration or Landscape Impact associated with this infrastructure project, potential effects are classified as either limited duration - generally applying during the construction phase - or permanent, for effects that shall persist during the operations phase and continue throughout the working life of the Project. A qualitative methodology is used to study these effects, whereby the first phase consists of identifying sources of visual impact, and the second phase relates to identifying and classifying environmental impacts. As a general rule, it is assumed that impact on the landscape during the construction phase shall be temporary, mainly due to the transitory nature of the sources of impact, the low level of prior human activity in certain areas, and the relatively low level of physical and visual accessibility of a significant proportion of the area subject to intervention. As most of the Project construction works will be situated underground, during the operations phase the main visual signatures of its existence will be the intakes and access roads. For further information on the methodology used for landscape impact assessment, see **Chapter 6, Section 6.1.4.10 of the EIS, and Annex 17 of Addendum 1.**

Remark N° 234

Flow rates

The Project represents a potential threat to the availability of drinking water for the 6 million people who inhabit the Metropolitan Region.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.05 Drinking water supply

Construction works and/or activities involved in the project (roads, movement of materials, transport of different products, etc) shall have no effect or impact whatsoever on the quality or security/safety of water supply in the Maipo River system. During the construction phase, Project interventions affecting watercourses shall cause only temporary effects resulting from Earth moving during excavation and other construction activities. This intervention shall affect small areas over short time periods, as it shall last only during the period while these installations are under construction (see **Section 6.4.1.4 of the EIS and Section VII, Question 17, in the Addendum**).

During operations, the PHAM shall not affect the Laguna Negra-Lo Encañado and El Yeso Reservoir system, which is managed by the company Aguas Andinas S.A, in its capacity as holder of the drinking water concession for Santiago; nor shall the Project affect the operational dynamics of the drinking water supply system. Therefore, the implementation of the PHAM does not imply any impact whatsoever on the supply of drinking water (see **Section I, responses 27 and 29, in the Addendum**).

Furthermore, the water abstracted by the Project shall be returned to the river 5 km upstream of the Toma Independiente or Independent Intake, operated by the company Aguas Andinas S.A., which abstracts water for drinking water supply to the city of Santiago; therefore, the PHAM shall not affect normal operations of this system. The PHAM shall only affect the delivery point of water in the tributaries of the Maipo River; in other words, water that currently does not drain into the Maipo River shall not be incorporated into that river's total flow.

However, in the event that an incident may arise as a result of an accident during construction, such as accidental spillages or rock falls, the procedures described in the Contingency Plan shall be implemented, consisting of a suite of actions to solve associated problems. This plan is explained in detail in **Chapter 7 of the EIS, Section 7.2.5**.

AGU.05.01 Drinking water quality

The process of hydroelectric power generation does not affect the physical/chemical qualities of water. Additionally, the PHAM does not plan to implement regulation installations that retain sediment. Thirdly, downstream of the discharge point the natural river conditions are maintained with regard to flow rate and physical/chemical properties.

During the construction of installations to be located in watercourses, the free-flowing course of the river is maintained through the construction of diversions through pipes laid along the river course for such purposes, or through channels that divert all flow, allowing free water circulation with no effect whatsoever on quality (see **Section I, Question 28, in the Addendum**).

The Project owner shall not make use of the Lo Encañado Lake or water usage rights owned by Aguas Andinas S.A. for this Project, instead opting to forgo usage of these resources and to replace the role that would have been fulfilled by the Lo Encañado Lake with a forebay located on a widening of the Alfalfa II plant headworks, located in the Alto Aucayes area on the Colorado River Valley (for details, see **EIS 2.2.1**). The Lo Encañado area shall be assigned a status of controlled access area at all times: it shall not be subject to any intervention whatsoever.

The Project Owner has made available a Water Quality Monitoring Program, with specifications for application during both the construction and operations phases. This program espouses a commitment to verify the effectiveness of environmental control measures designed to minimize the effects of works construction activities during the construction phase.

For further information on the Monitoring Program, see **Sections 8.2 and 8.3 in Chapter 8 of the EIS**.

Remark N° 235 Sources of Water Transfer

The company is promoting a project that will construct 70 km of tunnels to transfer water from one river basin to another, which is prohibited under the water law.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

Remark N° 236 Government

What is the Government's defense for the inhabitants of San José, or does it not care whether they die?

Thematic responses

OTR.02 CONAMA

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

Remark N° 237 Water

How is the government going to help if, in the event of drought, this project is going to leave us without water, half of which is used to keep the human population alive and half for the plants? A few years ago there were three years of drought, and they had to bring in water from Santiago so the Quillay plants, which are a protected species, would not dry out.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04.04 Monitoring and control of flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	Rain gauge station		
	406,157	6,259,100	
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section**

8.2.3).

For more information, see **Annex 17 of the Addendum.**

**F&F Biodiversity Impact
Flora and Fauna**

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempe Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neopteris curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Liolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopus cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. In parallel, the study investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 240

Regarding water, the Environmental Impact Study does not specify how the quality of water that is recaptured for treatment and production of drinking water in the area will be affected; nor does it provide a comparison of the situation before and after the construction of the project. Equally, it fails to clearly establish how the implementation of the project will affect the usage of currently held water usage rights, particularly for irrigation users and drinking water supply. It is clear that the Environmental Impact Study does not include measures that will allow ecological flow rates in the river basin to be guaranteed.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in
**Chapter 2 of the
EIS.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical

variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

AGU.05 Drinking water supply

Construction works and/or activities involved in the project (roads, movement of materials, transport of different products, etc) shall have no effect or impact whatsoever on the quality or security/safety of water supply in the Maipo River system. During the construction phase, Project interventions affecting watercourses shall cause only temporary effects resulting from Earth moving during excavation and other construction activities. This intervention shall affect small areas over short time periods, as it shall last only during the period while these installations are under construction (see **Section 6.4.1.4 of the EIS and Section VII, Question 17, in the Addendum**).

During operations, the PHAM shall not affect the Laguna Negra-Lo Encañado and El Yeso Reservoir system, which is managed by the company Aguas Andinas S.A, in its capacity as holder of the drinking water concession for Santiago; nor shall the Project affect the operational dynamics of the drinking water supply system. Therefore, the implementation of the PHAM does not imply any impact whatsoever on the supply of drinking water (see **Section I, responses 27 and 29, in the Addendum**).

Furthermore, the water abstracted by the Project shall be returned to the river 5 km upstream of the Toma Independiente or Independent Intake, operated by the company Aguas Andinas S.A., which abstracts water for drinking water supply to the city of Santiago; therefore, the PHAM shall not affect normal operations of this system. The PHAM shall only affect the delivery point of water in the tributaries of the Maipo River; in other words, water that currently does not drain into the Maipo River shall not be incorporated into that river's total flow.

However, in the event that an incident may arise as a result of an accident during construction, such as accidental spillages or rock falls, the procedures described in the Contingency Plan shall be implemented, consisting of a suite of actions to solve associated problems. This plan is explained in detail in **Chapter 7 of the EIS, Section 7.2.5**.

AGU.05.01 Drinking water quality

The process of hydroelectric power generation does not affect the physical/chemical qualities of water. Additionally, the PHAM does not plan to implement regulation installations that retain sediment. Thirdly, downstream of the discharge point the natural river conditions are maintained with regard to flow rate and physical/chemical properties.

During the construction of installations to be located in watercourses, the free-flowing course of the river is maintained through the construction of diversions through pipes laid along the river course for such purposes, or through channels that divert all flow, allowing free water circulation with no effect whatsoever on quality (see **Section I, Question 28, in the Addendum**).

The Project owner shall not make use of the Lo Encañado Lake or water usage rights owned by Aguas Andinas S.A. for this Project, instead opting to forgo usage of these resources and to replace the role that would have been fulfilled by the Lo Encañado Lake with a forebay located on a widening of the Alfalfa II plant headworks, located in the Alto Aucayes area on the Colorado River Valley (for details, see **EIS 2.2.1**). The Lo Encañado area shall be assigned a status of controlled access area at all times: it shall not be subject to any intervention whatsoever.

The Project Owner has made available a Water Quality Monitoring Program, with specifications for application during both the construction and operations phases. This program espouses a commitment to verify the effectiveness of environmental control measures designed to minimize the effects of works construction activities during the construction phase.

For further information on the Monitoring Program, see **Sections 8.2 and 8.3 in Chapter 8 of the EIS**.

Remark N° 241

The Environmental Impact Study fails to indicate the measures that will be taken in the event that water quality monitoring during the construction and operations phases may record negative findings. Additionally, it fails to indicate the points and frequency at which monitoring will take place; such points should be established at all liquid industrial waste discharge sites, with monitoring on a monthly basis.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds in-stream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate time series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.04 Monitoring and control of flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Q_e) approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
Alto Volcán	Stream gauge station	406,157	6,259,100
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán		
Alto Volcán	Control Station	407,468	6,259,751

Alto Volcán	La Engorda Intake Control Station	406,780	6,260,782
Alto Volcán	Las Placas Intake Control Station	407,181	6,260,081
Alto Volcán	Colina Intake Control Station	405,768	6,261,231

Yeso River	El Morado Intake Rain gauge station PBN (15)	391,504	6,262,449
Yeso River	Control Station El Yeso Intake	399,666	6,272,077
Colorado River	Stream gauge station El Sauce	380,449	6,287,261
Colorado River	Intake control station Colorado River	389,063	6,292,501

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum.RES Waste**

The Project Owner indicates that most waste generated will be produced during the Project's construction phase. Two types of waste will be produced:

- **Solid waste:**
Construction waste such as wood, piping offcuts, rubble, wires, waste packaging, metals, etc.
Domestic waste or waste similar to domestic waste; plant waste such as remains of shrubs, weeds, and smaller quantities of tree waste removed from work sites.
- **Liquid waste:**
Applicable to the following activities: concrete production, washing and preparation of aggregates, and washing of truck chassis and load beds, machinery, and tools. Other liquid waste relates to wastewater from bathrooms, showers, canteens, and other activities conducted within encampments and site installations.

Gener will place strict contractual requirements on Contractors during the construction phase, aiming to ensure suitable management and final disposal of waste. Additionally, contractors and subcontractors shall agree to comply with regulations and oversight actions established by Law, to be applied to all works of this nature. The planned environmental management manual will prevent the occurrence of any pollution events linked to the Project (**see EIS, Annex 18**).

RES.01 Regulations and Responsibilities

In order to ensure the efficient, safe, and responsible treatment and management of waste matter generated by the PHAM an additional plan has been developed, the "Waste Management Plan for Work Sites, Works Installations, and Encampments", describing the procedures and equipment necessary for the management and disposal of waste produced during the construction of the Project, and which also specifies the responsibilities required under its implementation, what records must be kept, and what reports must be prepared for the purposes of control and oversight (Annex 18 of the EIS).

Gener will enforce implementation and compliance with the Project's environmental measures during construction management, placing strict contractual requirements on Contractors with the aim of ensuring suitable management and final disposal of waste. **RES.02 Location**

a) Handling of solid waste

Infrastructure for the integrated management of solid waste throughout the life of the Project, addressing the full gamut of temporary storage, preparation, and classification for transport, will comprise: waste collection and storage sites at the point where it is generated; areas for non-hazardous waste; and an area for hazardous waste. These waste storage areas, for non-hazardous and hazardous waste, will be located as shown in tables 5.1.1 (pages 7 and 8) and 5.3.1 (pages 11 and 12) in Annex 18 of the EIS, respectively.

Domestic waste and organic waste similar to domestic waste will be disposed of in a sanitary landfill site, while construction waste other than rubble and domestic waste or organic waste similar to domestic waste will be sent to the waste management area for classification, where materials with potential residual value will be returned for reuse or recycling, and the remainder will be dispatched to a sanitary landfill site (Annex 18 of the EIS, page 6).

b) Handling of liquid waste

● **Wastewater**

Wastewater produced in encampments will be subject to primary and secondary treatment, provided by installing modular activated sludge treatment plants at each encampment. These systems are based on unitary operations, with units designed and equipped to treat wastewater input such as to attain a level of purity sufficient for discharge or reuse with no associated risks to persons or to the environment, in full compliance with the regulations stipulated in Supreme Decree 1-90.

Wastewater generated at work areas, through the use of chemical bathrooms, will be transported to by the contractor in wastewater transport trucks to authorized sites for subsequent treatment.

Sludge generated through wastewater treatment will be removed by the works contractor for transport and disposal at authorized sites on a weekly basis. The sludge will be removed in wastewater transport trucks, and in accordance with the volume of sludge

produced it is expected that each encampment will require 2 to 3 journeys by 6 m3 capacity wastewater transport trucks per week, throughout the construction phase. Meanwhile, during the operations phase, the project will use the existing installations at the

existing Alfalfa Plant Control Room, with no requirement to install a new wastewater treatment system, and thus not producing the sludge that such a system would generate.

For more information, see **Annex 18 of the EIS**.

● **Liquid industrial waste**

In view of the characteristics of this type of wastewater, the project plans to install a

sequential sedimentation system. In view of this situation, a settling pond will be installed at each work site to permit the separation of

liquid industrial waste into clear water and settleable sludge. (see **Annex 5 of Addendum 1**)

RES.03 Characteristics

The types of waste to be produced during the construction phase, and the characteristics thereof, are as follows:

Characteristics of solid waste

Solid non-hazardous waste

This class of waste includes:

- Construction waste: consisting of wood, piping offcuts, rubble, wires, waste packaging, metals, empty cans and drums used to transport paint and adhesives, and other similar items.
- Domestic waste and other waste similar to domestic waste: basically includes leftover food from canteens, packaging, paper, card, and similar materials.
- Plant waste: consisting of remains of shrubs, weeds, and smaller quantities of tree waste removed from work sites.

Hazardous solid waste

Types of hazardous waste produced by the Project correspond to waste generated in workshops, storage areas, and work sites, such as:

- Solvents
- Oil waste
- Lubricating grease
- Batteries
- Oil filters

Characteristics of liquid waste

Wastewater

This class of liquid waste relates to wastewater from bathrooms, showers, canteens, and other activities conducted within encampments, site installations, and work sites. This wastewater will be subject to primary and secondary treatment, provided by installing modular activated sludge wastewater treatment plants at each encampment.

Liquid industrial waste

Liquid industrial waste shall be generated only through the following activities: concrete production, washing and preparation of aggregates, and washing of truck chassis and load beds, machinery, and tools.

As a result of this fact, this type of liquid waste shall be generated only at work sites.

Meanwhile, wastewater shall not be produced at the Project's encampments, as these areas shall be used only for personnel lodgings.

For more information, see **Annex 18 of the EIS**.

RES.04 Impact

Gener considers the suitable handling of waste produced by the Project to be of particular importance, and to this end it has designed rigorous programs for the handling, collection and storage, transport, and final disposal, reuse or sale of the different forms of waste that shall be generated at the Project's encampments and site installations, as well as its work sites. These programs have been designed specifically taking into account the particular features of the area where the Project is to be implemented, as well as regulations in force and the requirements imposed by the authorities during the Project's environmental evaluation. In general this category includes non-hazardous waste produced during construction activities and from domestic sources (the latter at workers' encampments), and production of this waste will cease at the end of the construction phase:

- Liquid waste will be reused or disposed of in compliance with applicable sector regulations. All discharge of treated wastewater will be conducted at isolated points, generally without the presence of other human use and with low physical and visual accessibility.
- For both hazardous and non-hazardous waste, the Project Owner plans to transport material for disposal in authorized sites, eliminating the possibility of creating centers of soil or water contamination that might have a negative effect on the quality of the area's scenery. The storage areas, rubble, and other materials stored on a temporary basis within site installations shall be removed once construction activities have been completed, and therefore shall have no impact on the landscape.

Remark N° 242

The Environmental Impact Study fails to indicate waste management procedures to be applied during both the implementation and operations phases of the project, applying to liquid industrial waste produced during activities such as the cleaning of machinery - as well as solid domestic and industrial waste. Equally, it fails to indicate how wastewater produced during the construction phase of the project will be disposed of. In the case of solid industrial waste, it is important to consider measures to comply with SESMA Resolution N° 5081, dated 1993, which establishes procedures for the declaration of solid industrial waste.

Thematic responses

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1)

Chapter 3 of the EIS provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

RES Waste

The Project Owner indicates that most waste generated will be produced during the Project's construction phase. Two types of waste will be produced:

- **Solid waste:**
Construction waste such as wood, piping offcuts, rubble, wires, waste packaging, metals, etc.
Domestic waste or waste similar to domestic waste; plant waste such as remains of shrubs, weeds, and smaller quantities of tree waste removed from work sites.
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Applicable to the following activities: concrete production, washing and preparation of aggregates, and washing of truck chassis and load beds, machinery, and tools. Other liquid waste relates to wastewater from bathrooms, showers, canteens, and other activities conducted within encampments and site installations.

Gener will place strict contractual requirements on Contractors during the construction phase, aiming to ensure suitable management and final disposal of waste. Additionally, contractors and subcontractors shall agree to comply with regulations and oversight actions established by Law, to be applied to all works of this nature. The planned environmental management manual will prevent the occurrence of any pollution events linked to the Project (**see EIS, Annex 18**).

RES.01 Regulations and Responsibilities

In order to ensure the efficient, safe, and responsible treatment and management of waste matter generated by the PHAM an additional plan has been developed, the "Waste Management Plan for Work Sites, Works Installations, and Encampments", describing the procedures and equipment necessary for the management and disposal of waste produced during the construction of the Project, and which also specifies the responsibilities required under its implementation, what records must be kept, and what reports must be prepared for the purposes of control and oversight (Annex 18 of the EIS).

Gener will enforce implementation and compliance with the Project's environmental measures during construction management, placing strict contractual requirements on Contractors with the aim of ensuring suitable management and final disposal of waste. **RES.02 Location**

a) Handling of solid waste

Infrastructure for the integrated management of solid waste throughout the life of the Project, addressing the full gamut of temporary storage, preparation, and classification for transport, will comprise: waste collection and storage sites at the point where it is generated; areas for non-hazardous waste; and an area for hazardous waste. These waste storage areas, for non-hazardous and hazardous waste, will be located as shown in tables 5.1.1 (pages 7 and 8) and 5.3.1 (pages 11 and 12) in Annex 18 of the EIS,

respectively.

Domestic waste and organic waste similar to domestic waste will be disposed of in a sanitary landfill site, while construction waste other than rubble and domestic waste or organic waste similar to domestic waste will be sent to the waste management area for classification, where materials with potential residual value will be returned for reuse or recycling, and the remainder will be dispatched to a sanitary landfill site (Annex 18 of the EIS, page 6).

b) Handling of liquid waste

• **Wastewater**

Wastewater produced in encampments will be subject to primary and secondary treatment, provided by installing modular activated sludge treatment plants at each encampment. These systems are based on unitary operations, with units designed and equipped to treat wastewater input such as to attain a level of purity sufficient for discharge or reuse with no associated risks to persons or to the environment, in full compliance with the regulations stipulated in Supreme Decree 1-90.

Wastewater generated at work areas, through the use of chemical bathrooms, will be transported to by the contractor in wastewater transport trucks to authorized sites for subsequent treatment.

Sludge generated through wastewater treatment will be removed by the works contractor for transport and disposal at authorized sites on a weekly basis. The sludge will be removed in wastewater transport trucks, and in accordance with the volume of sludge

produced it is expected that each encampment will require 2 to 3 journeys by 6 m3 capacity wastewater transport trucks per week, throughout the construction phase. Meanwhile, during the operations phase, the project will use the existing installations at the

existing Alfalfa Plant Control Room, with no requirement to install a new wastewater treatment system, and thus not producing the sludge that such a system would generate.

For more information, see **Annex 18 of the EIS**.

• **Liquid industrial waste**

In view of the characteristics of this type of wastewater, the project plans to install a sequential sedimentation system. In view of this situation, a settling pond will be installed at each work site to permit the separation of liquid industrial waste into clear water and settleable sludge.

(see **Annex 5 of Addendum 1**)

RES.03 Characteristics

The types of waste to be produced during the construction phase, and the characteristics thereof, are as follows:

Characteristics of solid waste

Solid non-hazardous waste

This class of waste includes:

- Construction waste: consisting of wood, piping offcuts, rubble, wires, waste packaging, metals, empty cans and drums used to transport paint and adhesives, and other similar items.
- Domestic waste and other waste similar to domestic waste: basically includes leftover food from canteens, packaging, paper, card, and similar materials.
- Plant waste: consisting of remains of shrubs, weeds, and smaller quantities of tree waste removed from work sites.

Hazardous solid waste

Types of hazardous waste produced by the Project correspond to waste generated in workshops, storage areas, and work sites, such as:

- Solvents
- Oil waste
- Lubricating grease
- Batteries
- Oil filters

Characteristics of liquid waste

Wastewater

This class of liquid waste relates to wastewater from bathrooms, showers, canteens, and other activities conducted within encampments, site installations, and work sites. This wastewater will be subject to primary and secondary treatment, provided by installing modular activated sludge wastewater treatment plants at each encampment.

Liquid industrial waste

Liquid industrial waste shall be generated only through the following activities: concrete production, washing and preparation of aggregates, and washing of truck chassis and load beds, machinery, and tools.

As a result of this fact, this type of liquid waste shall be generated only at work sites.

Meanwhile, wastewater shall not be produced at the Project's encampments, as these areas shall be used only for personnel lodgings.

For more information, see **Annex 18 of the EIS**.

RES.04 Impact

Gener considers the suitable handling of waste produced by the Project to be of particular importance, and to this end it has designed rigorous programs for the handling, collection and storage, transport, and final disposal, reuse or sale of the different forms of waste that shall be generated at the Project's encampments and site installations, as well as its work sites. These programs have been designed specifically taking into account the particular features of the area where the Project is to be implemented, as well as regulations in force and the requirements imposed by the authorities during the Project's environmental evaluation. In general this category includes non-hazardous waste produced during construction activities and from domestic sources (the latter at workers' encampments), and production of this waste will cease at the end of the construction phase:

- Liquid waste will be reused or disposed of in compliance with applicable sector regulations. All discharge of treated wastewater will be conducted at isolated points, generally without the presence of other human use and with low physical and visual accessibility.
- For both hazardous and non-hazardous waste, the Project Owner plans to transport material for disposal in authorized sites, eliminating the possibility of creating centers of

soil or water contamination that might have a negative effect on the quality of the area's scenery.

Remarks and Responses

Remark N° 242 Page 3

The storage areas, rubble, and other materials stored on a temporary basis within site installations shall be removed once construction activities have been completed, and therefore shall have no impact on the landscape.

Remark N° 243

The Environmental Impact Study does not specify the natural watercourses that are to be subject to intervention. In this regard, it is important to bear in mind that the modification of natural watercourses and intakes must be authorized by the Directorate General of Water - and as a result, the sector permits that the Project Owner will have to apply for an obtain must be identified.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant,

and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 244

The Environmental Impact Study does not specify the impact mitigation or compensation measures to be applied to biodiversity impact, bearing in mind that the area where the project is planned to be implemented is located within an Ecological Preservation Area. Furthermore, the Environmental Impact Study baseline information does not include material on the water, plant, and animal life resources in the project's area of influence.

Thematic responses

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles,

70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neopteris curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Lilolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the

sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

F&F.02.02 Mitigation

Aquatic flora and fauna

The Project calls for a suite of multi-purpose environmental management measures that aim to minimize its effects on living organisms, including: minimization of watercourse areas to be subject to intervention by prioritizing such works for late summer and early fall seasons (period of lowest flow rates), the adoption of special precautions to prevent accidental spillages into watercourses (prohibition of the storage of lubricant drums in or near watercourses, etc), and permanent maintenance of ecological flow rates.

For more detailed information, including technical documentation that complements the information described above, see Annex 17 of the Addendum.

Terrestrial Flora and Vegetation

In order to prevent and/or minimize the Project's effects on plant life, it plans to adopt a number of integrative measures: micro-routing in advance of starting work on-site, in order to identify specimens of plants listed in any conservation category and subject to impact; compensation with the planting of 10 specimens for every one destroyed, in the case of non-woodland species listed for conservation; implementation of a woodland management plan applicable to woodland areas, which describes its measures in accordance with Article 5 of the Woodland Law; implementation of vegetation restoration plans at muck disposal sites, encampments, artificial slopes, and tunnel access terraces (EIS, Annexes 7 and 29). More in-depth information on complementary measures is provided in Annex 6 of Addendum 1.

Terrestrial fauna

Specific wildlife environmental management measures have been proposed for each particular species, taking into account prior experience in the success of these measures in similar projects. These measures will be implemented in continual coordination with the Servicio Agrícola y Ganadero. Principal measures include: capture of individuals belonging to species of conservation interest for rescue and relocation; controlled perturbation actions; and habitat replacement. Other measures are based on the use of signage, training for Contractors, and contractual requirements for on-site supervision (see details in Section 6.4.1.6 of the EIS).

See Annex 4 of the Addendum for the native wildlife rescue and relocation plan.

Remark N° 245

The Environmental Impact Study makes no mention of potential impacts that could be generated by the radiation emitted by these power plants, which could affect telecommunications services such as cellular telephones, AM and FM radios, open signal TV, and community radio broadcasters, or other services used by the community of San José de Maipo. As far as the public has been informed, AES Gener S.A. has not conducted studies into these impacts that would make available grounded information on the topic.

Thematic responses

ELE Electrical Installations

The electrical installations presented in the EIS comprise the substation, to be located in the El Sauce area, the characteristics of which are to be found in **Annex 27 of the EIS**; given that the electricity transport layout (cabling and towers) is to be presented to the Environmental Impact Assessment System once all background information is available.

ELE.03 Transmission lines

In view of the project's location, close to Santiago, it is expected that the distance covered by the definitive cabling layout will be short, involving a minimum of sectors not subject to prior intervention. With regard to the specific location of the cabling layout, plans call for the use of the existing high tension power line used by the Queltehues, Volcán, and Maitenes Plants.

Once the layout of the high tension power line has been defined, the Project Owner will submit this plan to the Environmental Impact Assessment System, in accordance with legislation in force. In line with the development of the Compliance Plan for environmental legislation applicable to the Project, the General Regulations applicable in this instance are indicated below:

Decree with Force of Law N°4, dated 05 February, 2007, setting forth the Recast, Coordinated, and Systematized Text of the General Law on Electrical Services.

The General Law on Electrical Services governs the generation, transmission, distribution, and regimen of concessions and tariffs applicable to electrical energy, and the functions of the State with regard to these areas.

Supreme Decree N° 327, Regulations Regarding the General Law on Electrical Services

The Regulations Regarding the General Law on Electrical Services establish, in their 8th Article, that hydroelectric power plants, electrical substations, and transmission lines may be installed without making a request for a concession, when the interested party wishes. These concessions may be provisional (in order to study projects) or definitive. A definitive concession is granted by a supreme decree issued by the Ministry of the Economy, by order of the President of the Republic. Permits relating to electrical installations that do not require concessions are granted by the corresponding Municipal Governments.

For further information and analysis on the aforementioned regulations, with regard to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see **Sections 3.1.6 and 3.1.7 of Chapter 3 of the EIS**, where more detailed versions of this information can be found.

SLD Health Impact

The Project owner shall take responsibility for ensuring compliance with health and safety regulations, in order to prevent any possible risk to health and physical integrity for the inhabitants of San José Maipo as well as the persons working on the Project.

SLD.05 Exposure to electromagnetic fields

As has already been mentioned, the Project's electrical layout design is a topic that is not described in this EIS, as the scope of this Study does not cover such installations.

In parallel with the presentation of the EIS for approval by the SEIA, the Project Owner is simultaneously engaged in the preparation of the basic engineering studies for the electrical layout design that will allow the Project to be connected to the SIC Central Grid. To date no definitive plans exist for the electrical connection layout, but it is still relevant to point out that:

1. In view of the project's location, close to Santiago, it is expected that the distance covered by the definitive cabling layout will be short, involving a minimum of sectors not subject to prior intervention.
2. With regard to the specific location of the cabling layout, plans call for the use of the existing high tension power line used by the Queltehues, Volcán, and Maitenes Plants.
3. According to existing scientific background information, no conclusive evidence current exists showing that electricity transmission systems cause harmful effects through radiation. This assumption is therefore ruled out.
4. Once the layout of the high tension power line has been defined, the Project Owner will submit this plan to the Environmental Impact Assessment System, in accordance with legislation in force.

Remark N° 246

One of the positive socio-economic impacts of the implementation of these power plants will be an input into the SIC Central Grid of 2,500 GWh of electricity per year, from the installed power level of 531 MW. No mention is made of any direct benefit to the users of electrical services in the district of San José de Maipo, which despite becoming an area that makes a significant contribution to electricity generation, faces tariffs set by Decree N° 276/2004 (published in the Official Gazette on 04/11/2004) that are the highest in the Metropolitan Region.

Thematic responses

Specific response

Tariffs for electrical energy used by residents of San José de Maipo are the exclusive responsibility of the company that distributes the power.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative,

that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

Remark N° 247

In terms of socio-economic impact, the Environmental Impact Study does not identify the project's impact on areas dedicated to livestock grazing, such as the Cajón de la Engorda Valley, etc.

Thematic responses

SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

SUE.02 Soils, meadows, and wetlands

The Project Owner has conducted a number of studies with the aim of characterizing the vegetation of summer grazing areas (La Engorda) (see details in Addendum 1, Annex 6, and in Chapter 5 of the EIS), as well as flora and vegetation studies in the Project's area of influence (EIS, Chapter 5).

These studies contain information compiled in fieldwork campaigns conducted in Fall 2005, Spring 2006, November 2007, March 15 and 16, 2008, and September 2008, which add to the body of knowledge available regarding vegetation in these areas.

The Lo Encañado area shall be assigned a status of controlled access area for works contractors at all times: it shall not be subject to any intervention whatsoever. For more information on vegetation areas that could be affected by the construction works, and to learn about mitigation measures proposed by the Project Owner, you are advised to review Annex 42 of the EIS and Annex 6 of the Addendum.

With regard to environmental regulations that apply specifically to vegetation and plant life, the Project Owner shall be subject to:

Supreme Decree 366 (Exploitation of Tamarugo, Carob, Chañar, Guayacán, Aextoxicon, Charcoal, Acacia, Boldo, Maiten, Litre, Bollen, and Quillay). This legal instrument governs the felling of trees and bushes.

Supreme Decree 4363 and D.L 701 (Approving the Definitive Text of the Law on Woodland and Regulations on Forest Promotion).

Article 2 of the Woodland Law establishes an obligation that land classified as for preferential woodland land use, as well as natural and artificial woodlands, are subject to woodland management plans approved by the National Forestry Commission (CONAF). Furthermore, Article 21 of Decree Law 701 establishes that any felling or usage of native woodland shall be subject to the CONAF's prior approval of the corresponding management plan.

Decree 82 (Prohibiting the Felling of Trees and Bushes in Indicated Andean High Mountain and Foothill Areas)

Article 102 Sector Environmental Permit (Permit for the felling or exploitation of native woodland, in any type of land, or plantations located in land with preferential characteristics for woodland use).

For further information and analysis on the aforementioned regulations and permits, as applicable to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see Sections 3.2.6 and 3.3.7 in Chapter 3 of the EIS.

Remark N° 248

The Project Owner makes no mention in the study of the social compensation mechanism that it plans to implement to channel the community support contributions that it has agreed to make, or the number of jobs for local residents and the mechanisms to be used to guarantee such hiring practices.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

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The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

CAL.02 Education

A goal of the Maitenes Foundation relates to education for children and young people against the backdrop of the natural environment (for more information on the goals and achievements of the Foundation, see Annex 26 of the EIS).

Gener firmly believes that contributions to the technical and vocational education and training of young people must keep sight of real employment possibilities. Therefore, as a first initiative it has earmarked resources for an education improvement project in the district, which will contribute to establishing education management for the restructuring of the school curriculum and professional technical capacity building, taking into account the features needed to boost local employability. Based on information and recommendations from this study, Gener, acting through the Maitenes Foundation, will undertake a Capacity Building for Employability Program fundamentally oriented towards those whose family, social, or economic situation has barred them from completing their education and training, or acquiring the skills needed in order to find work. **SOC Socio-**

Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.01 Jobs in the District

Local labor availability is estimated based on figures from the Labor Brokerage and Information Office. This information will be made available to construction contractors so that they can preferentially hire local workers. According to information compiled at the Project Office in San José de Maipo, the project has registered a total of 980 potential project workers, of whom 390 are unemployed, broken down as follows:

Mine workers:	105
Carpenters, Builders, and Rebar Layers:	157
Heavy Machinery Operators:	131
Non-specialized day laborers:	39
Drivers:	87
Specialized technical personnel:	60
Welders:	26
Foremen and supervisors:	7
Graduate professionals:	20
Cleaning, security, and canteen workers:	120
Administrative personnel:	91
Other, misc.:	139

The average project workforce during the construction phase (5 years) is estimated at 2000 persons, and during the Citizen Participation process the company has agreed to ensure that an average of at least 500 local persons will be on the payroll during the construction of the Project.

Remark N° 249

During the citizen participation process, the company has expressed its willingness to consider contributions in the district of San José de Maipo over a ten year period, without taking into account that the average operational lifespan of projects of this type runs to over 50 years of useful life; this social organization has therefore stated that the minimum period for compensation to the community to be promised should be at least 30 years.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

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Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

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Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. Details are provided regarding the principal characteristics of

this program in **Chapter 8, Section 8.2.7 of the EIS**, and in **Annex 39 of the EIS**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

Remark N° 250

In order to monitor the ecological flow rates defined by the Directorate General of Water, it is requested that monitoring stations with satellite technology be installed to monitor the main tributaries of the Maipo River subject to intervention under the project (Volcán, Yeso, and Colorado Rivers).

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility

(Addendum, Section 5, Question 2).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility

(Addendum, Section 5, Question 2).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	Rain gauge station		6,259,100
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 251

A periodic monitoring committee should be created, with the participation of social organizations in the country that are currently inscribed as legally registered bodies, to control and verify compliance with the commitments adopted by the Project Owner in environmental and social matters.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

Remark N° 252

Finally, CONAMA should transcribe the corresponding environmental classification resolution regarding commitments adopted by the Project Owner regarding environmental impact mitigation and social compensation for the community of San José de Maipo.

Thematic responses

OTR.02 CONAMA

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

Remark N° 253

Ecological Flow Rate and Watercourse Flow Velocity

Please explain and provide a justification for how the ecological flow rate of 0.7 m³/s in the Colorado River will meet day to day demand in the El Manzano irrigation channel, given that no part of the project documentation makes reference to maintenance activities between the river and the channel during the useful life of the project.

Additionally, please provide modeling results and an explanation of what the different watercourse flow velocities will be, comparing the current situation with a situation with the minimum ecological flow rate at the El Manzano Channel intake. This model and explanation should consider the damage caused to the channel itself, and the measures that the project shall include for application throughout its working life to ensure that such damage does not occur - for example, sediment buildup that is not currently considered. According to the DGA, it is known that the impact on habitat conditions arising as a result of reduction in flow rate in the ecosystem can only be determined by analyzing river flow velocity and depth. In this context, the critical variables are river depth, in which area migratory processes up and down the river require a minimum depth of 20 cm (according to the DGA and Swiss legislation); while in terms of flow velocity, the direct influence affects plant and animal habitat conditions, leading to changes in the species present in the environment depending on organisms' adaptation to variations in flow velocity. A details clarification of the situation in the El Manzano irrigation channel is requested.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at

least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Q_e) approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	Stream gauge station		406,157
	La Engorda Stream Bridge		6,259,100
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers,

calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.

2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information

on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998). As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity. It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence. Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area. The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (AGU.06.01), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity. Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence. Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are attributable more to the ways in which aggregates are extracted from river than to quantities extracted. It can be concluded that the Maipo River system can be managed such that, With the Project operational, present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them. Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

AGU.06.03 Maipo River Sand Production

With regard to the extraction of aggregates in the Maipo River, during the operations phase of the PHAM, the Project will not modify current natural sediment (aggregates) transport dynamics occurring in the river. In effect, under the natural dynamics, sediment transport takes place mainly in the months of November, December, and January, as a result of snow and ice melt in the high mountains, and it is during this season that variations in flow rate in the Maipo River caused by the project stand at their lowest levels. The same behavior applies to winter season rises in river level. It must be pointed out that the PHAM returns water to the Maipo River in the Las Lajas area, located upstream of the El Canelo zone, and therefore downstream of this point the river's flow dynamics with the project shall be identical to those currently observed. It is of great importance to observe that currently, without the PHAM in operation, slightly downstream of the Las Vertientes area (in the La Obra stretch of the river), during certain times of the year flow rate in the Maipo River watercourse drops significantly, leaving the river bed dry, due to water abstraction at the following intakes: La Sirena Channel, San Carlos Channel, Independent Intake owned by Aguas Andinas, etc. Average water abstraction flow rates attributable to the main drinking water and irrigation intakes, many of which also make use of hydroelectric power as a byproduct, but discounting the effects of existing hydroelectric plants on these channels that discharge directly into the intakes, amounts to 113 m³/second, which is equal to the average annual flow rate in the Maipo River at Las Vertientes. Depending on water availability, the annual abstraction rate at these intakes varies between 78 and 164 m³/second. This situation clearly explains the high level of perturbation observed in the behavior of the Maipo River watercourse downstream of Las Vertientes, where the riverbed is dry except during periods of increased water level and in unusually wet years. It is for this reason that the Project Owner asserts that its activities will have no impact on the current situation in the sand extraction sites located on the Maipo River.

AGU.06.04 Discharge effects

Water capture in advance of in-situ gravel removal leads first to a reduction in sediment load in water carried through the headworks to the turbine rooms, while the solid materials that is retained is returned to the river. At the point where water is discharged from the plants (Las Lajas area), water that has passed through the turbines - which contains a certain quantity of sediment - once again mixes with the water in the rivers, returning to its original conditions in terms of average sediment load (**Addendum, Section I, Question 28**). At the point where water is returned to the Maipo River, in the Las Lajas area, there will be no degradation of the riverbed as it is composed entirely of rocks. It should be mentioned that the flow rate discharged from the PHAM at this point is always lower than the flow rate in the Maipo River just upstream. During the operations phase of the Project, planned maintenance activities do not include any cleaning of tunnels and culverts. Inside the tunnels, the cross sectional area for water flow is small enough to prevent sedimentation. This is shown through the operation of the Alfalfal Plant for 20 years without any cleaning of the tunnels being included among maintenance activities. The only operations that lead to the discharge of sediment are the discharge

of gravel traps at the inlets, and the flushing of the sand traps, returning sediment to the river once a certain volume has built up within them. These operations are conducted intermittently and for short time periods (1 minute for sand traps, 10 minutes

for gravel traps), at variable frequency depending on the season. For more information see the **Addendum, Section IV, Question 3.**

**F&F Biodiversity Impact
Flora and Fauna**

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

Remark N° 254

Indicate the guarantee of water usage availability in the El Manzano irrigation channel, and how compliance is to be established and regulated

In the event that the PHAM indicates that there will be no variations in river flow velocity, it is requested that the study clearly indicate how this will be demonstrated, such that it does not occur in the El Manzano irrigation channel. Considering that the Water Code clearly expresses that the abstraction and replacement of water must always be conducted in such a way as not to affect the rights held over the same water by third parties, in terms of quantity, water quality, usage availability, and other aspects. In this regard. How and in what does Gener provide a guarantee to the El Manzano channel users that the irrigation channel over which they hold water rights shall always be available for use, abstracting water from the Colorado River? What regulation system will apply if the above is not respected or complied with? Where is this commitment set forth?

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services. For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry. In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively. Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 from the year 1990, in the Public Registry of Water Usage Rights, maintained by the Public Water Registry (Catastro Público De Aguas) (**see the Addendum, Section V, Question 24, Part vi**).

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4**

in Chapter 2 of the EIS.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own

rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 “Hanging” channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project’s area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

AGU.04.04 Monitoring and control of flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the

watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility
(Addendum, Section 5, Question 2).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

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Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Northing	Easting
	Alto Volcán		
	406,157	Stream gauge station	6,259,100
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 255

Information on the Social Evaluation of the Project and the Monetary Value of Planned Mitigation Measures

It is required that the PHAM clearly indicate, in its report or special text, how the project has been socially valued at social market prices, using a quantitative and not descriptive or qualitative methodology, addressing not only benefits and expenditure but also social costs in different areas where different public bodies have issued remarks, and in different fields. If the project value amounts to US\$ 700 million, what is the value of the wide range of mitigation measures planned for implementation?

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term

mutually beneficial relationships between the project and its surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

PRO.01.01 Compensation

The concept of compensation refers to the act of indemnifying damages or harm caused. Within the framework of the EIS, the Project Owner has issued a proposal to the competent authority regarding a suite of environmental management measures aiming to minimize, compensate, and restore the Project's impacts, making their implementation sustainable (Chapter 6 of the EIS).

In this regard, compensation is understood to be included in the spirit or end goal of the environmental management measures proposed by the Project Owner, following the evaluation of the direct and indirect effects of the PHAM on each of the environmental components stipulated in Supreme Decree 95, SEIA Regulations.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. In parallel, the study investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 256
Information on Social Costs with Monetary Linkages to Variations in the Wide Range of Variable that the PHAM will Modify in its Area of Influence

It must be made a matter of public information whether or not the required mitigation measures have been valued and quantified, applying to the project and its area of influence, which is taken into account in a number of fields that have been made public in the study and by CONAMA on its web page at <https://www.e-seia.cl/documentos/documento.php?idDocumento=2933048>, and whether the social costs have been identified, associated with modifications in a wide range of variables that will be affected, and therefore pertaining to a situation that currently does not exist. A specific table indicating these valuations and the variations in the current and future situation is requested.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent

decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

PRO.02 EIS Additional and Complementary Information

In accordance with consultation procedures conducted by oversight services, further studies and information have been incorporated into Addendum 1, which complements existing information provided in the EIS. Regarding ecological flow rates (**Annex 17**), cultural heritage (**Annex 14**) and the management of summer grazing areas (**Annex 6**).

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. In parallel, the study investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 257

Information on the Year in which Mitigation Expenditure will be Recouped

As the project is to make a profit, it would be interesting to know in what year the project becomes economically profitable for GENER, and in what year the company will recoup expenditure on mitigation.

Thematic responses

Specific response

Information on the profitability of the Project is confidential to the Project Owner in all cases, but as the Project Owner is a registered company, its financial statements are issued on an annual basis.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate

for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

Remark N° 258

Request and Verification of Adequate Response to Sernatur Ord. N° 392, 09/07/2008

The Project Owner is requested to provide clear and detailed information as required by the National Tourism Service Metropolitan Region Office Coordinator in Ordinary Communication N° 392, dated July 09, 2008, in all point, and particularly in point 2, with remarks on all paragraphs thereof. It is a fundamental point that CONAMA is the sole point of contact for this process, and this body has experts in different fields who take into account the issues raised by SERNATUR in order to ensure that the responses issued by GENER are correct, relevant, and technically verified such as to guarantee that none of the issues mentioned in the Ordinary Communication indicated above shall occur.

Thematic responses

OTR Other

This section relates to certain special situations that could not be categorized, or that are linked to specific requests, disqualifications, or situations that feature a clear political component, against either the environmental authority or the Project Owner.

OTR.02 CONAMA

Remark N° 259

Information on the Existence of and Identification of the Social Costs of Variables Affected by the PHAM

Information is requested based on the social evaluation methodologies used by MIDEPLAN in the evaluation of projects presented by private interests, including whether or not the social costs associated with modifications in the wide range of variables subject to impact under the PHAM have been identified, relating to lower river water flow rates, channel installations, changes in sediment erosion and transport, etc.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. Details are provided regarding the principal characteristics of

this program in **Chapter 8, Section 8.2.7 of the EIS**, and in **Annex 39 of the EIS**.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. In parallel, the study investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 260

What is the certainty that PHAM 2008, with a lower ecological flow rate than PHAM 2007, will provide sufficient water at the El Manzano Intake to provide for rights held

Information is required regarding how the PHAM will ensure that channel intakes, particularly the El Manzano Channel Intake, will receive all of the water stipulated in their water rights, in a situation with a proposed ecological flow rate in the Colorado River that is lower in the second project proposal than it was in the first - which was withdrawn early this year.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds in-stream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see **Table 2.3.4**

in Chapter 2 of the EIS.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that is, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project

to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the

Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and**

Section IV, Question 5.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

AGU.04.04 Monitoring and control of flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Q_e) approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
Alto Volcán	Stream gauge station	406,157	6,259,100
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán)		
Alto Volcán	Control Station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control Station	406,780	6,260,782
	Las Placas Intake		

Alto Volcán	Control Station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control Station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449

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Yeso River	PBN (15) Control Station El Yeso Intake	399,666	6,272,077
Colorado River	Stream gauge station El Sauce	380,449	6,287,261
Colorado River	Intake control station Colorado River	389,063	6,292,501

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 261**Why does the PHAM not plan for the maintenance of the El Manzano Channel Intake**

Information is required regarding why PHAM planned expenditure on new installations does not cover the maintenance and operation of the link between the Colorado River and the currently existing channel for the entire lifespan of the Project.

Thematic responses

Specific response

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

Remark N° 262
Request and Verification of Adequate Response to Sernatur Ord. N° 148,
11/07/2008 of the
DGA Conservation Department and PRH

A clear, detailed, and specific response is requested regarding how the PHAM will guarantee the requirement stipulated in Point 6 of the remarks made in Ordinary Communication 148, dated July 11, 2008, issued by the DGA Conservation Department and PRH, for the specific case of the El Manzano Irrigation Channel.

Thematic responses

Specific response

The Project Owner reiterates its commitment to ensuring that necessary infrastructure exists in the river to permit water to enter the channels at all times, in accordance with the rights granted and the availability of the river throughout the life of the PHAM project.

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources.

During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at

least in part.

Remark N° 263

An Explanation is Requested Regarding Measures to be Applied in the Colorado River due to the Risk of Mass Flow Removal

Given that the DGA itself indicates that the Colorado River presents a risk of mass flow removal, the PHAM is requested to indicate in details what technical measures, emergency plans, and specific mitigation measures are to be applied and administered such that the El Manzano Irrigation Channel suffers no impact in the arrival of water through its intake throughout the useful lifespan of the project.

Thematic responses

Specific response

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in
**Chapter 2 of the
EIS.**

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

PRO.01.01 Compensation

The concept of compensation refers to the act of indemnifying damages or harm caused. Within the framework of the EIS, the Project Owner has issued a proposal to the competent authority regarding a suite of environmental management measures aiming to minimize, compensate, and restore the Project's impacts, making their implementation sustainable (Chapter 6 of the EIS).

In this regard, compensation is understood to be included in the spirit or end goal of the environmental management measures proposed by the Project Owner, following the evaluation of the direct and indirect effects of the PHAM on each of the environmental components stipulated in Supreme Decree 95, SEIA Regulations.

Remark N° 264
Request and Verification of Adequate Response to Sernatur Ord. N° 148,
11/07/2008 of the
DGA Conservation Department and PRH

A clear, detailed, and specific response is requested regarding the requirements stipulated in point Point 33 of the remarks made in Ordinary Communication 148, dated July 11, 2008, issued by the DGA Conservation Department and PRH. In this regard it is vital that information is included on the analysis conducted into impact affecting the specific case of the El Manzano Irrigation Channel. If such analysis has not been conducted, it is hereby requested, to include all mitigation measures that may be necessary.

Thematic responses

Specific response

The Project Owner reiterates its commitment to ensuring that necessary infrastructure exists in the river to permit water to enter the channels at all times, in accordance with the rights granted and the availability of the river throughout the life of the PHAM project.

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

Remark N° 265

Request for Quantitative Evaluation of the Impact of Changes in Sedimentation Dynamics in the Colorado River Upstream and Downstream of the El Manzano Intake with an Ecological Flow Rate that has yet to be Approved by the DGA

It is requested that the PHAM be expanded to indicate the quantitative and not descriptive evaluation of the impact of changes in the sedimentation dynamics that will occur in the Colorado River upstream and downstream of the El Manzano Irrigation Channel, with the minimum ecological flow rate.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (**AGU.06.01**), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with and without the Project, in the Project's area of influence. Watercourse degradation problems and effects on certain Highway infrastructure installations, which can be observed currently downstream of Las Vertientes, are

attributable more to the ways in which aggregates are extracted from river than to quantities extracted.

It can be concluded that the Maipo River system can be managed such that, With the Project operational , present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them.

Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

AGU.06.04 Discharge effects

Water capture in advance of in-situ gravel removal leads first to a reduction in sediment load in water carried through the headworks to the turbine rooms, while the solid materials that is retained is returned to the river. At the point where water is discharged from the plants (Las Lajas area), water that has passed through the turbines - which contains a certain quantity of sediment - once again mixes with the water in the rivers, returning to its original conditions in terms of average sediment load (**Addendum, Section I, Question 28**).

At the point where water is returned to the Maipo River, in the Las Lajas area, there will be no degradation of the riverbed as it is composed entirely of rocks. It should be mentioned that the flow rate discharged from the PHAM at this point is always lower than the flow rate in the Maipo River just upstream.

During the operations phase of the Project, planned maintenance activities do not include any cleaning of tunnels and culverts. Inside the tunnels, the cross sectional area for water flow is small enough to prevent sedimentation. This is shown through the operation of the Alfalfa Plant for 20 years without any cleaning of the tunnels being included among maintenance activities.

The only operations that lead to the discharge of sediment are the discharge of gravel traps at the inlets, and the flushing of the sand traps, returning sediment to the river once a certain volume has built up within them. These operations are conducted intermittently and for short time periods (1 minute for sand traps, 10 minutes for gravel traps), at variable frequency depending on the season. For more information see the **Addendum, Section IV, Question 3**.

Remark N° 266

Indicate or Clarify Requirements Upstream and Downstream of the El Manzano Intake

The PHAM does not indicate or clarify and/or evaluate the effects of the project on the solid transport dynamics upstream and downstream of the El Manzano Intake; an analysis is requested investigating effects on the erosion-sedimentation equilibrium, and knock-on effects downstream of the project in the area indicated, as well as measures to reduce any deterioration in this issue.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum**.

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.01 Sedimentation equilibrium

The analysis of the Project's effects on sediment transport dynamics was conducted taking into account two considerations:

1. Potential foreseen solid streambed wear (solid transport capacity) in the rivers, calculated on a theoretical basis in accordance with the hydraulic characteristics of these rivers and theoretical calculation relationships.
2. Effective solid transport rate (or real solid wear), calculated based on background information available for the creation of physical models (López y Tapia 1996) and information on rates of extraction of aggregates (CONAMA 1999 and MOP-REG 1998).

As would be expected, a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

It was determined that there would be no significant variation in real solid wear, comparing the situation as modeled with and without the Project, in the Project's area of influence.

Nonetheless, downstream of Las Vertientes the sediment transport capacity is lower than sediment availability, due to the drastic reduction in water flow caused by existing intakes. This explains the concentration of aggregates extraction plants in this area.

The aforementioned assertions take into account:

- * Reduction in potential solid transport capacity in the Colorado River does not affect the availability of sediment in that river, given that it is greater than the actual quantity transported.
- * The level of aggregates extraction in the Maipo River downstream of Las Vertientes has been estimated at 2.4 million tons per year, representing less than 30% of sediment deposited in that zone.

AGU.06.02 Erosion

As explained in the previous thematic section, "**Sedimentation equilibrium**" (**AGU.06.01**), a reduction in flow rate in any watercourse results in a theoretical reduction in potential solid transport capacity.

Nonetheless, as stated in that section, there would be no significant variation in real solid wear/entrainment, comparing the situation as modeled with

and without the Project, in the Project's area of influence.
Watercourse degradation problems and effects on certain Highway
infrastructure installations, which can be observed currently downstream of
Las Vertientes, are attributable more to the ways in which aggregates are

extracted from river than to quantities extracted.
It can be concluded that the Maipo River system can be managed such that, With the Project operational , present aggregates extraction levels can be maintained, minimizing negative impacts on the watercourses and installations located in them.
Gener has offered to collaborate in the integrated studies currently being conducted by the Ministry of Public Works' Hydraulic Works Department.

AGU.06.04 Discharge effects

Water capture in advance of in-situ gravel removal leads first to a reduction in sediment load in water carried through the headworks to the turbine rooms, while the solid materials that is retained is returned to the river. At the point where water is discharged from the plants (Las Lajas area), water that has passed through the turbines - which contains a certain quantity of sediment - once again mixes with the water in the rivers, returning to its original conditions in terms of average sediment load (**Addendum, Section I, Question 28**).

At the point where water is returned to the Maipo River, in the Las Lajas area, there will be no degradation of the riverbed as it is composed entirely of rocks. It should be mentioned that the flow rate discharged from the PHAM at this point is always lower than the flow rate in the Maipo River just upstream.

During the operations phase of the Project, planned maintenance activities do not include any cleaning of tunnels and culverts. Inside the tunnels, the cross sectional area for water flow is small enough to prevent sedimentation. This is shown through the operation of the Alfalfal Plant for 20 years without any cleaning of the tunnels being included among maintenance activities.

The only operations that lead to the discharge of sediment are the discharge of gravel traps at the inlets, and the flushing of the sand traps, returning sediment to the river once a certain volume has built up within them. These operations are conducted intermittently and for short time periods (1 minute for sand traps, 10 minutes for gravel traps), at variable frequency depending on the season. For more information see the **Addendum, Section IV, Question 3**.

Remark N° 267

Clarify why the irrigation usage situation in the El Manzano area is not analyzed under mitigation measures

Sections of the Maipo River and other watercourses that will be affected in this regard are identified, with a system of zoning according to irrigation usage. What will happen in the specific case of El Manzano?

Thematic responses

Specific response

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in
**Chapter 2 of the
EIS.**

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural

conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 268

Explain how irrigation in El Manzano is guaranteed with the proposed ecological flow rate

As established in the project documentation, which indicates that one of the watercourses subject to intervention is El Manzano, both directly and indirectly, it would be interesting to know how the proposed ecological flow rate will ensure compliance with the ecological functions and services of this watercourse. If the answer is affirmative, how will this be ensured?

Thematic responses

Specific response

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4 in Chapter 2 of the EIS**.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that is, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**).

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river

flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams. It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Q_e) approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Q_e has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	Rain gauge station		6,259,100
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 269

Why is the San José de Maipo Master Plan not considered in the PHAM?

Why does the PHAM not consider the San José de Maipo Master Plan project for the El Manzano area, prepared by the company XEREX, supported by the Housing Ministry SEREMI for the Metropolitan Region, which recognizes that a problem exists relating to water shortages, and when the irrigation channel itself represents an alternative source of treated water for sanitation and human consumption?

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see **Table 2.3.4**

in Chapter 2 of the EIS.

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that is, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River,

in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfafal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfafal I Power Plant, and shall make use of water abstracted from

the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **PRO The Project**

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly

frequented, minimizing their visual impact.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1) **Chapter 3 of the EIS** provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

Remark N° 270

What actions are to be taken regarding future wear and tear to the road surface of Route G-25

According to background information provided in the PHAM documentation, the project's impact on roads is estimated based on saturation points. In this regard, the Project Owner is requested to present a justification for not taking into account wear and tear on the road surface resulting from the implementation of the Project. With regard to road wear, please state how the project will manage deterioration in the road infrastructure of Route G-25.

Thematic responses

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayes, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions.

The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS**.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

VIA.04 Damage to roads and trails

The level of intervention to be generated by the Project was determined based on levels of saturation and deterioration of service levels, arising as a result of vehicle traffic caused by the Project - this Project highway impact analysis therefore did not take into account wear and tear on the road surface, as this parameter is not relevant when truck traffic complies with weight limits established by the Ministry of Public Works' Highways Department. In this regard, the Project Owner will permanently supervise weight control, in order to ensure compliance with the stipulations made in Ministry Public Works Supreme Decree 158/1980 which establishes gross weight limits for highways, as well as Decree 200, dated July 1993 and Decree 396, dated November 1993, establishing gross weight limits for urban streets. In both cases vehicle weight may not exceed 45 tons. For more information on measures planned by the Project Owner to ensure compliance with these regulations, see specific information in **Chapter 3 of the EIS**.

Furthermore, the Project Owner plans to undertake the conservation of Route G-25 (El Volcán area) and Route G-455 to the El Yeso Reservoir. Details of the current condition of each of these routes and planned road conservation measures, see the Road Improvement Program, in **Annex 19** of the EIS.

Finally, in advance of the start of road conservation activities, the corresponding Projects were approved by the Santiago Metropolitan Region Regional Highways Department. With regard to areas of interest for tourism, the conservation of part of the highway network and year-round maintenance of the more remote stretches of Route G-455 to El Yeso and Route G-25 from El Yeso Bridge to the El Volcán area will improve accessibility, favoring an increase in influx of visitors or the arrival of visitors over lengthier periods of the year, as these areas are largely inaccessible to tourists for a significant part of the winter season.

Remark N° 271
Monographs required in the PHAM

Do plans exist for a monograph on the road surface of Route G-25 before starting work on the project? If the answer is negative, why not?

Thematic responses

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayes, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions. The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS**.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

VIA.04 Damage to roads and trails

The level of intervention to be generated by the Project was determined based on levels of saturation and deterioration of service levels, arising as a result of vehicle traffic caused by the Project - this Project highway impact analysis therefore did not take into account wear and tear on the road surface, as this parameter is not relevant when truck traffic complies with weight limits established by the Ministry of Public Works' Highways Department. In this regard, the Project Owner will permanently supervise weight control, in order to ensure compliance with the stipulations made in Ministry Public Works Supreme Decree 158/1980 which establishes gross weight limits for highways, as well as Decree 200, dated July

1993 and Decree 396, dated November 1993, establishing gross weight limits for urban streets.

In both cases vehicle weight may not exceed 45 tons. For more information on measures planned by the Project Owner to ensure compliance with these regulations, see specific information in **Chapter 3 of the EIS**.

Furthermore, the Project Owner plans to undertake the conservation of Route G-25 (El Volcán area) and Route G-455 to the El Yeso Reservoir. Details of the current condition of each of these routes and planned road conservation measures, see the Road Improvement Program, in **Annex 19** of the EIS.

Finally, in advance of the start of road conservation activities, the corresponding Projects were approved by the Santiago Metropolitan Region Regional Highways Department. With regard to areas of interest for tourism, the conservation of part of the highway network and year-round maintenance of the more remote stretches of Route G-455 to El Yeso and Route G-25 from El Yeso Bridge to the El Volcán area will improve accessibility, favoring an increase in influx of visitors or the arrival of visitors over lengthier periods of the year, as these areas are largely inaccessible to tourists for a significant part of the winter season.

Remark N° 272

Indicate real quantity of trucks to be used

The quantity of trucks to be used transporting explosives should be specified, as such transport will be required at a number of work sites; for this purpose, please indicate a) number of trucks to be used for each purpose, b) characteristics of the trucks, c) routes to be taken from the supplier to the work site, d) frequency (daily and weekly), and e) time period during which this activity will take place.

Thematic responses

RSG Risk

The Project Owner possesses a general risk prevention strategy that imposes certain measures on the Project during its different stages of advance. This strategy features the following components:

- a) Measures incorporated into the Project's engineering design.
- b) Systematic verification of compliance with applicable regulations c)
Establishment of restricted areas
 - c.1) Area restricted due to their archeological, paleontological, or heritage value
 - c.2) Area of natural value that requires protection by the Project
 - c.3) Officially protected area.
- d) Expert supervision during construction
- e) Training regarding environmentally sensitive issues
- f) Internal risk management and accident prevention programs g)
Separation of works installations and encampments

For further information on each of these points, please see **Chapter 7 of the EIS**, which specifies the **Environmental Management Plan**, the **Risk Control and Prevention Plan** designed for the Project, the safety measures to be adopted in light of the risks identified, and, finally, the **Accident control plan**, to be activated in the event of the failure of the preventive measures taken by the Project Owner. Furthermore, **Annex 32 of the EIS** presents the **Risk and Contingency Prevention Plan** for contractors.

RSG.02 Transport of Hazardous Substances

As indicated in **Section 2.4.1 of the EIS**, fuel will be supplied in tanker trucks owned by the distributor companies, from their centers in the Metropolitan Region to the areas of site installations and encampments.

The project will comply fully with Supreme Decree 298/95 of the Ministry of Transport and Telecommunications, which regulates procedures for the transport of cargo containing substances the characteristics of which render them hazardous or represent risks to health, safety, and the environment, on roads and highways, as stated in **Section 3.2.8 of the EIS**. The frequency of journeys and routes for the transport of explosives shall be defined by the contractor depending on its construction scheduling. The project principal will report these aspects to the environmental authorities.

All explosive products will be transported in conformity with Supreme Decree 72/1985 of the Ministry of Mining, Law 17,798 and complimentary regulations, and NCH 385/Of.55. Safety Measures in the Transport of Flammable and Explosive Substances.

Each Contractor must obtain the necessary permits for transport and suitable storage of explosives required at different work areas. The frequency of journeys and routes for the transport of explosives shall be defined by the contractor.

Annex 32 of the EIS and Section I, Question 57 in the Addendum show the risk prevention measures that the project will adopt in order to avoid the spillage of hazardous substances during transport.

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

Remark N° 273 Missing information from PHAM EIS required, for new models and Simulations

Clarification is requested regarding point 2.4.1 E) "Additional Road Traffic Related to the Project" for the construction phase, regarding the number of journeys started each day (external flow) for concrete transport, presented in Table 2.4.1.1, "Supplies Required for the Construction of the Project" and what relationship exists between the 1,690,000 m³ reported in this table (equivalent to approximately 6040 truckloads per year) and the 60,000 tons of cement indicated in Table 2.3.1.3. Why has this not been taken into account in the highway impact study?

Thematic responses

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**.

The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.03 Congestion

When PHAM Project construction activities begin, there will be an increase in road traffic movements in the immediate surroundings of the work area. This vehicle movement will be related mainly to the transport of supplies and machinery to the works installations, transport of excavation spoil to muck deposition sites, and, to a lesser extent, the transport of personnel to the work sites. For more information on traffic flow increases resulting from the Project, see **Chapter 2, section 2.4.1, part E, Annex 14 of the EIS, and Annexes 9 and 14 of Addendum 1**.

The PHAM highway impact analysis takes into account all works and activities under the Project, including the transport of supplies, machinery, and personnel. According to modeling studies, it is predicted that there will be no significant impact on highway usage (levels of saturation of new and existing roads and intersections). For more information on the Project's road operations, measurements used and models derived, see **Annexes 9 and 15 of the Addendum**. Additionally, increases in noise emissions are analyzed in **Section 6.4.1.2 of the EIS**.

Notwithstanding the above, it is assumed that, given that certain construction activities shall be conducted at the same times that other road users wish to make use of certain sections of specific roads, a certain level of annoyance may be caused, and for this reason the PHAM has adopted a number of control and mitigation measures indicated in **Chapters 6 and 2 of the EIS** and in **Annex 14 of the EIS**, as well as **Annexes 9 and 17 of Addendum 1**.

It is considered likely that, in view of the predominance of the tourist industry in the local economy of the district of the Maipo Valley, a certain level of annoyance may be caused at certain points and at specific moments, mainly due to conflicts between PHAM road usage and the movements of visitors. As indicated in the EIS Baseline Study, this is an area where tourists come to enjoy walks and peace and quiet, on weekends and holidays. In particular, there are 2 specific tourism attractions located in the same areas as site installations: The El Yeso and the Alto Volcán area, where special measures shall be taken, as specified in **Chapter 6 of the Project EIS**.

Additionally, **Annex 32 of the EIS** specifies emergency procedures to be adopted in the event of transport accidents caused by project vehicles.

Remark N° 274

Lack of analysis of road safety on Route G-25

Considering that Route G-25 is a route that, although during the week it features varied and significant traffic during the early hours of the morning, given that it consists of a road surface with lanes, from the first bridge at the eastern end of Route G-25, with two way traffic and a variety of gradients and curves, from a road safety perspective it is necessary to possess information on why truck traffic from La Florida or Puente Alto heading eastwards is not eliminated, as shown in the plan in the file 3119_02_1*.pdf, shown in Appendix 3 of the highway impact study

Thematic responses

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayes, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions.

The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS**.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

VIA.03 Congestion

When PHAM Project construction activities begin, there will be an increase in road traffic movements in the immediate surroundings of the work area. This vehicle movement will be related mainly to the transport of supplies and machinery to the works installations, transport of excavation spoil to muck deposition sites, and, to a lesser extent, the transport of personnel to the work sites. For more information on traffic flow increases resulting from the Project, see **Chapter 2, section 2.4.1, part E, Annex 14 of the EIS, and Annexes 9 and 14 of Addendum 1**.

The PHAM highway impact analysis takes into account all works and activities under the Project, including the transport of supplies, machinery, and personnel. According to modeling studies, it is predicted that there will be no significant impact on highway usage (levels of saturation of new and existing roads and intersections). For more information on the Project's road operations, measurements used and models derived, see **Annexes 9 and 15 of the Addendum**.

Additionally, increases in noise emissions are analyzed in **Section 6.4.1.2 of the EIS**.

Notwithstanding the above, it is assumed that, given that certain construction activities shall be conducted at the same times that other road users wish to make use of certain sections of specific roads, a certain level of annoyance may be caused, and for this reason the PHAM has adopted a number of control and mitigation measures,

indicated in **Chapters 6 and 2 of the EIS** and in **Annex 14 of the EIS, as well as Annexes 9 and 17 of Addendum 1**.

It is considered likely that, in view of the predominance of the tourist industry in the local economy of the district of the Maipo Valley, a certain level of annoyance may be caused at certain points and at specific moments, mainly due to conflicts between PHAM road usage and the movements of visitors. As indicated in the EIS Baseline Study, this is an area where tourists come to enjoy walks and peace and quiet, on weekends and holidays. In particular, there are 2 specific tourism attractions located in the same areas as site installations: The El Yeso

and the Alto Volcán area, where special measures shall be taken, as specified in **Chapter 6 of the Project EIS**. Additionally, **Annex 32 of the EIS** specifies emergency procedures to be adopted in the event of transport accidents caused by project vehicles.

Remark N° 275

Lack of a project for road signage and markings on Route G-25, for trucks heading east to west and vice versa

Traffic signage and waypoints that are proposed ought to be covered in a specific project, indicating the measures, location, and type of reflectance of the sign material, which should be of high intensity or category G3, with an anti-graffiti protective film in the works area.

Thematic responses

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.01 Regulations

For information on road and transport regulations in force and applicable to the project, see **Chapter 3, point 3.2**, "Specific environmental regulations applicable to the Project", and the EIS.

The Project Owner stipulates that:

- Crossroad and junction signage projects linked to public roads will fully comply with the requirements established by the Highways Department, particularly in relation to intersection regulation, and reglamentary, preventive, and informative signage, and geometric aspects, such as turning radius and lane channeling. For more information, see **Annex 14 of the EIS and Section I, Question 38 in the Addendum**.
- With regard to site installation supply lines, in the event that such lines are installed alongside roadways, prior authorization will be obtained from the Highways Department.
- The Project Owner will permanently supervise weight control, in order to ensure compliance with the stipulations made in Ministry Public Works Supreme Decree 158/1980 which establishes gross weight limits for highways, as well as Decree 200, dated July 1993, and Decree 396, dated November 1993, establishing gross weight limits on urban roads. In both cases vehicle weight may not exceed 45 tons.
- In the event that the transport of supplies and equipment for the construction phase, as a result of the size and/or weight of items to be transported, requires loads above and beyond those stipulated in regulations, the corresponding authorization will be requested from the Highways Department and applicable safety measures will be agreed on a case by case basis.
- As indicated in **sections 2.5.3 and 6.4.1.1 of the EIS**, trucks carrying material at all locations apart from work areas, and all trucks on public highways, will be covered with tarpaulins in order to avoid the spillage of material, in compliance with Decree 75 and 1987 of the Ministry of Transporting I communications, which indicates that "loads must be covered with a suitably sized canvas sheet or tarpaulin, such as to avoid the emission particulate matter into the air", as indicated in section **3.2.1 of the EIS**.
- The Project will comply with the stipulations of Decree 18 2001 and subsequent amendments, prohibiting the movement of cargo vehicles within the Anillo Américo Vespucio ring road.

Within the framework of the SEIA and the environmental requirements and/or conditions imposed by the Authorities at the time of approving the Project, the Project Principal confirms and accepts ultimate responsibility relating to transport and any contingency or accident that may arise and/or cause damage to the environment or third parties and that is linked to works and activities undertaken as part of the PHAM, as required in conformity with legislation in force. This does not affect collective liability and compliance that, regardless of the SEIA, is established under the Civil Code and administrative procedures in this field.

Remark N° 276 Lack of analysis of road safety on Route G-25

A response is required regarding whether road signage and highways defenses on the current Route G-25 was or was not analyzed, as the current situation is plagued by siting problems, poor maintenance, and the absence of items that lead to potential accident risks affecting vehicle traffic moving in both directions, regularly endangering light vehicles and heavy trucks moving along a route with many gradients, curves, and - during the winter - areas where ice and snow may occur at certain points and along certain stretches of the road. A response is required regarding the nature of the analysis and consideration made by the PHAM in this regard, and also regarding its responsibility to maintain the road's signage and defenses, repairing damage and low visibility caused by graffiti, mud, and loss of reflectance. Notwithstanding the fact that road maintenance is the responsibility of the Highways Department, under the circumstances under which the PHAM will use that road, it should administer measures necessary to mitigate current deficiencies and to avoid risks to those who are not connected to the project; to this end consideration should be given to the stipulations made in the Highways Signage Manual, Chapters 2, 3, and 5. See http://www.conaset.cl/cms_conaset/jsp/pagina.jsp?secc=10&zona=10&ctnd=342

Thematic responses

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.01 Regulations

For information on road and transport regulations in force and applicable to the project, see **Chapter 3, point 3.2**, "Specific environmental regulations applicable to the Project", and the EIS.

The Project Owner stipulates that:

- Crossroad and junction signage projects linked to public roads will fully comply with the requirements established by the Highways Department, particularly in relation to intersection regulation, and reglamentary, preventive, and informative signage, and geometric aspects, such as turning radius and lane channeling. For more information, see **Annex 14 of the EIS and Section I, Question 38 in the Addendum**.
- With regard to site installation supply lines, in the event that such lines are installed alongside roadways, prior authorization will be obtained from the Highways Department.
- The Project Owner will permanently supervise weight control, in order to ensure compliance with the stipulations made in Ministry Public Works Supreme Decree 158/1980 which establishes gross weight limits for highways, as well as Decree 200, dated July 1993, and Decree 396, dated November 1993, establishing gross weight limits on urban roads. In both cases vehicle weight may not exceed 45 tons.
- In the event that the transport of supplies and equipment for the construction phase, as a result of the size and/or weight of items to be transported, requires loads above and beyond those stipulated in regulations, the corresponding authorization will be requested from the Highways Department and applicable safety measures will be agreed on a case by case basis.
- As indicated in **sections 2.5.3 and 6.4.1.1 of the EIS**, trucks carrying material at all locations apart from work areas, and all trucks on public highways, will be covered with tarpaulins in order to avoid the spillage of material, in compliance with Decree 75 and 1987 of the Ministry of Transporting I communications, which indicates that "loads must be covered with a suitably sized canvas sheet or tarpaulin, such as to avoid the emission particulate matter into the air", as indicated in **section 3.2.1 of the EIS**.
- The Project will comply with the stipulations of Decree 18 2001 and subsequent amendments, prohibiting the movement of cargo vehicles within the Anillo Américo Vespucio ring road.

Within the framework of the SEIA and the environmental requirements and/or conditions imposed by the Authorities at the time of approving the Project, the Project Principal confirms and accepts ultimate responsibility relating to transport and any contingency or accident that may arise and/or cause damage to the environment or third parties and that is linked to works and activities undertaken as part of the PHAM, as required in conformity with legislation in force. This does not affect collective liability and compliance that, regardless of the SEIA, is established under the Civil Code and administrative procedures in this field.

Remark N° 277

Incorrect vehicle measurements in the study, they should be corrected and a new study conducted Highway Impact Study

In accordance with evaluation methodologies for highway projects both with and without reassignment (Sectra 1988) and MINTRATEL (SEREMI RM), set forth in the Manual of Procedures and Methodology for Studies on Impact on the Urban Transport System, it is indicated that analyses of models and simulations should be based on current and up-to-date information. The PHAM project plans to break ground after the end of 2008. In the highway impact study, the measurements used are the same as those used for the first PHAM project, which was withdrawn by the Project Owner - as shown in the file Part A: Transit Measurements, dated November 23, 2006, and modeled in SIDRA software on December 26, 2007. New traffic measurements should be made, and similarly the models should be reformulated, given that along the transport axis of Av. La Florida recent years have seen greater demand for alternative routes, as well as a major growth in housing density in a number of areas that were less populated in 2006 than in 2008. One piece of background information that demonstrates the random nature of the measurement system can be observed regarding Route G-455, running to the El Yeso Reservoir, for which one record dates back to November 16, 2007, and the others are from 2006; while the implementation of the project, if approved, will theoretically start in 2009.

Thematic responses

PRO.02 EIS Additional and Complementary Information

In accordance with consultation procedures conducted by oversight services, further studies and information have been incorporated into Addendum 1, which complements existing information provided in the EIS. Regarding ecological flow rates (**Annex 17**), cultural heritage (**Annex 14**) and the management of summer grazing areas (**Annex 6**).

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**.

The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.03 Congestion

When PHAM Project construction activities begin, there will be an increase in road traffic movements in the immediate surroundings of the work area. This vehicle movement will be related mainly to the transport of supplies and machinery to the works installations, transport of excavation spoil to muck deposition sites, and, to a lesser extent, the transport of personnel to the work sites. For more information on traffic flow increases resulting from the Project, see **Chapter 2, section 2.4.1, part E, Annex 14 of the EIS, and Annexes 9 and 14 of Addendum 1**.

The PHAM highway impact analysis takes into account all works and activities under the Project, including the transport of supplies, machinery, and personnel. According to modeling studies, it is predicted that there will be no significant impact on highway usage (levels of saturation of new and existing roads and intersections). For more information on the Project's road operations, measurements used and models derived, see **Annexes 9 and 15 of the Addendum**. Additionally, increases in noise emissions are analyzed in **Section 6.4.1.2 of the EIS**.

Notwithstanding the above, it is assumed that, given that certain construction activities shall be conducted at the same times that other road users wish to make use of certain sections of specific roads, a certain level of annoyance may be caused, and for this reason the PHAM has adopted a number of control and mitigation measures indicated in **Chapters 6 and 2 of the EIS** and in **Annex 14 of the EIS**, as well as **Annexes 9 and 17 of Addendum 1**.

It is considered likely that, in view of the predominance of the tourist industry in the local economy of the district of the Maipo Valley, a certain level of annoyance may be caused at certain points and at specific moments, mainly due to conflicts between PHAM road usage and the movements of visitors. As indicated in the EIS Baseline Study, this is an area where tourists come to enjoy walks and peace and quiet, on weekends and holidays. In particular, there are 2 specific tourism attractions located in the same areas as site installations: The El Yeso and the Alto Volcán area, where special measures shall be taken, as specified in **Chapter 6 of the Project EIS**.

Additionally, **Annex 32 of the EIS** specifies emergency procedures to be adopted in the event of transport accidents caused by project vehicles.

Remark N° 278**Traffic light timings: how were they obtained?**

At intersections located within the district of La Florida, a response is requested as to how the timings and programming of traffic lights was obtained. The timings used in the models are different to those currently observed at these intersections.

Thematic responses**VIA Roads**

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**.

The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.03 Congestion

When PHAM Project construction activities begin, there will be an increase in road traffic movements in the immediate surroundings of the work area. This vehicle movement will be related mainly to the transport of supplies and machinery to the works installations, transport of excavation spoil to muck deposition sites, and, to a lesser extent, the transport of personnel to the work sites. For more information on traffic flow increases resulting from the Project, see **Chapter 2, section 2.4.1, part E, Annex 14 of the EIS, and Annexes 9 and 14 of Addendum 1**.

The PHAM highway impact analysis takes into account all works and activities under the Project, including the transport of supplies, machinery, and personnel. According to modeling studies, it is predicted that there will be no significant impact on highway usage (levels of saturation of new and existing roads and intersections). For more information on the Project's road operations, measurements used and models derived, see **Annexes 9 and 15 of the Addendum**. Additionally, increases in noise emissions are analyzed in **Section 6.4.1.2 of the EIS**.

Notwithstanding the above, it is assumed that, given that certain construction activities shall be conducted at the same times that other road users wish to make use of certain sections of specific roads, a certain level of annoyance may be caused, and for this reason the PHAM has adopted a number of control and mitigation measures indicated in **Chapters 6 and 2 of the EIS** and in **Annex 14 of the EIS**, as well as **Annexes 9 and 17 of Addendum 1**.

It is considered likely that, in view of the predominance of the tourist industry in the local economy of the district of the Maipo Valley, a certain level of annoyance may be caused at certain points and at specific moments, mainly due to conflicts between PHAM road usage and the movements of visitors. As indicated in the EIS Baseline Study, this is an area where tourists come to enjoy walks and peace and quiet, on weekends and holidays. In particular, there are 2 specific tourism attractions located in the same areas as site installations: The El Yeso and the Alto Volcán area, where special measures shall be taken, as specified in **Chapter 6 of the Project EIS**.

Additionally, **Annex 32 of the EIS** specifies emergency procedures to be adopted in the event of transport accidents caused by project vehicles.

Remark N° 279

Correction of times for temporary project downtime and correction of simulation models and software used

According to information provided in the impact study, highlighting the fact that analysis must be conducted for the project construction phase, when the highest levels of vehicle traffic will be generated through the transport of personnel, materials, machinery, and supplies; analyses of intersections must be prepared for this situation, with temporary downtime included in the models for the construction and not only modeling isolated intersections, when Av. La Florida, a major transport axis, does not function in this way. Analyses of this route should therefore be prepared using a network model, using other software such as TRANSYT. This analysis should be approved by the Traffic Control Operations Unit, in order to suitably classify and identify the mitigation measures that will be necessary at the different intersections analyzed. Therefore, the highway impact study should be reformulated. Additionally, the isolated intersections are not the same as the ones that also appear in Table 4, in Point VII. 3 Impact area of influence. As the measurements have been used for modeling in SIDRA, the analysis is incorrect for five reasons: first, the measurements are not up to date; second, the Av. La Florida route is a network and does not operate as a number of isolated intersections; third, the Transantiago process was launched in the city on February 10, 2007; fourth, as a result of works at Vicuña Mackenna (METRO) and new station openings, traffic demand along the Av. La Florida route has experienced reassignments; and finally, the significant increase in housing density observed in areas along the Av. La Florida route, including gigantic real estate developments such as Hacienda El Peñón and housing lots for sale at Las Vizcachas and the Aguas Andinas area, as well as in settlements in the district of San José de Maipo in the past two years.

Thematic responses

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayas, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions. The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS**.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

VIA.03 Congestion

When PHAM Project construction activities begin, there will be an increase in road traffic movements in the immediate surroundings of the work area. This vehicle movement will be related mainly to the transport of supplies and machinery to the works installations, transport of excavation spoil to muck deposition sites, and, to a lesser extent, the transport of personnel to the work sites. For more information on traffic flow increases resulting from the Project, see **Chapter 2, section 2.4.1, part E, Annex 14 of the EIS, and Annexes 9 and 14 of Addendum 1**.

The PHAM highway impact analysis takes into account all works and activities under the Project, including the transport of supplies, machinery, and personnel. According to modeling studies conducted,

it is predicted that there will be no significant impact on highway usage (levels of saturation

of new and existing roads and intersections). For more information on the Project's road operations, measurements used and models derived, see **Annexes 9 and 15 of the Addendum**. Additionally, increases in noise emissions are analyzed in **Section 6.4.1.2 of the EIS**. Notwithstanding the above, it is assumed that, given that certain construction activities shall be conducted at the same times that other road users wish to make use of certain sections of specific roads, a certain level of annoyance may be caused, and for this reason the PHAM has adopted a number of control and mitigation measures, indicated in **Chapters 6 and 2 of the EIS** and in **Annex 14 of the EIS, as well as Annexes 9 and 17 of Addendum 1**.

It is considered likely that, in view of the predominance of the tourist industry in the local economy of the district of the Maipo Valley, a certain level of annoyance may be caused at certain points and at specific moments, mainly due to conflicts between PHAM road usage and the movements of visitors. As indicated in the EIS Baseline Study, this is an area where tourists come to enjoy walks and peace and quiet, on weekends and holidays. In particular, there are 2 specific tourism attractions located in the same areas as site installations: the El Yeso and the Alto Volcán area, where special measures shall be taken, as specified in **Chapter 6 of the Project EIS**. Additionally, **Annex 32 of the EIS** specifies emergency procedures to be adopted in the event of transport accidents caused by project vehicles.

Remark N° 280

Provide a plan indicating geometric design and management measures of proposals

The EIS indicates that prior to the launch of the construction of the PHAM, the Highways Department will be presented with the plans for turning installations permitting trucks returning from the work sites to the aggregates pit in the La Obra area to make the left turn in a safe and comfortable manner, without altering traffic flow at that point. Does this mean that a left turn only lane will be built? It is also indicated that the design of the junction will be perpendicular to the southern lane of Route G-25, allowing it to face the current access point for entry to the aggregates pit. What reglamentary and preventive signage is planned for this area, arriving from the West? A geometric design study should be added now, and not after the facts, regarding safety measures planned for this phase of the project.

Thematic responses

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.01 Regulations

For information on road and transport regulations in force and applicable to the project, see **Chapter 3, point 3.2**, "Specific environmental regulations applicable to the Project", and the EIS.

The Project Owner stipulates that:

- Crossroad and junction signage projects linked to public roads will fully comply with the requirements established by the Highways Department, particularly in relation to intersection regulation, and reglamentary, preventive, and informative signage, and geometric aspects, such as turning radius and lane channeling. For more information, see **Annex 14 of the EIS and Section I, Question 38 in the Addendum**.
- With regard to site installation supply lines, in the event that such lines are installed alongside roadways, prior authorization will be obtained from the Highways Department.
- The Project Owner will permanently supervise weight control, in order to ensure compliance with the stipulations made in Ministry Public Works Supreme Decree 158/1980 which establishes gross weight limits for highways, as well as Decree 200, dated July 1993, and Decree 396, dated November 1993, establishing gross weight limits on urban roads. In both cases vehicle weight may not exceed 45 tons.
- In the event that the transport of supplies and equipment for the construction phase, as a result of the size and/or weight of items to be transported, requires loads above and beyond those stipulated in regulations, the corresponding authorization will be requested from the Highways Department and applicable safety measures will be agreed on a case by case basis.
- As indicated in **sections 2.5.3 and 6.4.1.1 of the EIS**, trucks carrying material at all locations apart from work areas, and all trucks on public highways, will be covered with tarpaulins in order to avoid the spillage of material, in compliance with Decree 75 and 1987 of the Ministry of Transporting I communications, which indicates that "loads must be covered with a suitably sized canvas sheet or tarpaulin, such as to avoid the emission particulate matter into the air", as indicated in **section 3.2.1 of the EIS**.
- The Project will comply with the stipulations of Decree 18 2001 and subsequent amendments, prohibiting the movement of cargo vehicles within the Anillo Américo Vespucio ring road.

Within the framework of the SEIA and the environmental requirements and/or conditions imposed by the Authorities at the time of approving the Project, the Project Principal confirms and accepts ultimate responsibility relating to transport and any contingency or accident that may arise and/or cause damage to the environment or third parties and that is linked to works and activities undertaken as part of the PHAM, as required in conformity with legislation in force. This does not affect collective liability and compliance that, regardless of the SEIA, is established under the Civil Code and administrative procedures in this field.

Remark N° 281

Clarification annual employment of personnel and quantity of external persons to work on the Project

With regard to the specific characterization of the qualified and unqualified personnel to be employed on the project, filling a wide range of positions during the construction and operations phases, the Project Owner should indicate how many persons will be employed by the PHAM for each year, in accordance with information provided in Figure 1, Activities during the Project Construction Phase, on page 5 of the Highway Impact Study. In view of this information, a response is required regarding how many persons will be brought in from outside of the population of San José de Maipo.

Thematic responses

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.01.01

Requirements

In view of the characteristics and scale of the Project, personnel with specific qualifications will be required for the operation and maintenance of plant machinery and equipment, during the operations phase. Conversely, during the Project Construction Phase, it is projected that labor requirements will create jobs not only for mining workers, but also for machinery operators, drivers, and both skilled and unskilled construction personnel, the latter working mainly as day laborers and assistants.

The population of the Project's area of direct influence has been found to possess levels of training and specialization (occupation as defined under the CIIU code) that shall permit them to access both skilled and unskilled work positions created by the Project.

SOC.02 Human contingent presence

The presence of Project employees will be temporary (limited both to the years of the construction phase, and to the working day organized into shifts), thus disincentivizing them and their families from moving to the area on a permanent basis. During the Project's construction phase, its employees shall sleep in the encampments described in the documentation, not making use of existing hotels and hostels located in and near the area's settlements.

Once the construction phase has been completed, the Project's installations and encampments shall be removed; they shall therefore not become part of existing settlements, or form new centers for the formation of settlements.

The PHAM plans call for the creation of 5 encampments, located away from settlements. These encampments will be operated as described in Annex 33, and each will house a permanent contingent of 200-400 employees, under the standard working regime adopted by mining installations. The transport of employees from the encampments to their places of residence shall have a frequency determined in accordance with the working shifts. Therefore, it is important to understand that under no circumstances shall the presence of Project employees in the area lead to the type of interaction with The resident community and demand for local services that currently occurs as a result of the flow of tourists and visitors, mainly during weekends, holidays, and the summer season.

In view of the above, the Project shall not lead to the following potential impacts: overpopulation at a local or district level (in existing settlements); or effects modifying local customs, economic service provision activities, connectivity, and local load capacity (understood to refer to the load placed on infrastructure and equipment).

As indicated in Annex 39 of the EIS, documentation supporting the analysis described above shall form part of activities under the Social Indicator Monitoring (SIM) program. This monitoring program is based on compiling information using qualitative and quantitative techniques developed in the field of Social Sciences, oriented towards investigating a suite of indices that pay due heed to trends in relevant variables for monitoring, selected in accordance with the characteristics of the Project and of the communities in the area where it is to be implemented. Reports will be issued twice per year containing the results obtained, including the use of graphical aids to show comparative changes in parameters from one study campaign to the next. This document will be delivered to CONAMA.

In general, by gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project may cause in its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities.

SOC.05 Migration

Job creation during construction, works to improve the quality of

certain roads and to maintain them, and the creation of other more minor roads, will help to encourage traditional families to remain in the area - as they themselves have stated, as most emigration among such groups is linked to lack of employment and the major difficulties imposed by the lack of public transport to some areas, the poor state of roads, and the isolation that they see as plaguing them, as a result of the closure of roads due to inclement weather conditions.

Conversely, the PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Addendum Section VII, Question 19**.

Remark N° 282

What works will be built at the El Manzano Intake?

The PHAM documentation does not include a layout map showing works to be built at the El Manzano intake and channel through to the Maipo River discharge spillway, including all natural watercourses involved. Similarly, no detailed information is included regarding the influence of water intakes on probable reductions in flow rates. Why did the PHAM not consider such factors, when this zone is located within the area of influence?

Thematic responses

Specific response

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in **Chapter 2 of the EIS**.

AGU.02.01

Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that it, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have

no effect whatsoever on the legitimate rights that various water user communities

hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 283

Explain

What is the reason for not considering mitigation works and their maintenance in areas where nothing currently exists, and where if works are built as a result of necessity imposed by the PHAM, in order to ensure the exercise of irrigation water usage rights held by the El Manzano Channel users? It should be born in mind that there is currently no need to maintain something that does not exist. In the future, if it is necessary for such works to be undertaken, this should be the responsibility of the PHAM and not the El Manzano Channel users. Maintenance should be guaranteed over an area running from the riverbed through to the start of the channel (flow diverter or marker), covering the full watercourse at the levels demanded for full exercise of the rights held, in terms of volume and velocity. What level and what specifics are referred to in the agreement made and explained at the citizen participation meeting held on August 23 in San José de Maipo, shown in the last few slides of the PowerPoint presentation made by GENER?

Thematic responses

Specific response

In conformity with commitments made in meetings held with the management of the El Manzano Channel at the offices of Gener between January and October 2008, Gener has agreed to underwrite the construction of new infrastructure necessary in order to ensure water capture from the Colorado River to which that community possesses legally granted rights, as well as to pay all additional maintenance costs that the community may incur as a consequence of the operation of the PHAM. Furthermore, Gener will pay all additional costs payable by the community to the DGA for corresponding permit applications.

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water

rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see

Table 2.3.4 in
**Chapter 2 of the
EIS.**

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a

suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate

of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 284

Impact on Wildlife Biodiversity in the Area

The AES Gener project plans for structures, activities, and changes in the environment that will directly and indirectly affect vertebrate and invertebrate species. The AES Gener EIS pays lip service to respecting the law on hunting, but this is not sufficient in terms of respect for the delicate biodiversity of the area affected. The documentation discusses "temporary and indirect" damage, but in my opinion the damage will be direct and permanent.

The EIS recognizes that 86 species of animals are to be found within the area affected, of which 16 are classified as vulnerable, and most exhibit a high level of endemism. In our analysis of this study, it strikes us that first of all, no study of aquatic wildlife has been conducted, with no mention of its existence and importance. Additionally, on analyzing the EIS we have noticed the absence of many species, offering the following list by way of example:

Mammals:

- Puma (*Puma concolor*)
- Lesser Grison (*Galictis cuja*)
- Noé Chinchilla Rat (*Euneomys noei*)
- Elegant Fat-tailed Mouse Opossum (*Thylamys elegans*)
- Long-Tailed Pygmy Rice Rat (*Oligoryzomys longicaudatus*)
- Vizcacha (*Lagidium viscacia*)
- Degu (*Octodon degus*)
- Darwin's Leaf-eared Mouse (*Phyllotis darwini*).
- Long-haired Grass Mouse (*Abrothrix longipilis*)
- Olive Grass Mouse (*Abrothrix olivaceus*)

Birds

- Piuquén
- Band-winged Nightjar (*Caprimulgus longirostris*)
- White Owl (*Tyto alba*)
- Cernícalo (*Falco sparverius*)
- Blanquillo (*Podiceps occipitalis*)
- Jote (*Coragyps atratus*)
- Peregrine Falcon (*Falco peregrinus*)
- Torcaza Patagioenas (*Columba araucana*)
- Dormilona de ceja blanca *Muscisaxicola albilora*
- Dormilona cenicienta *Muscisaxicola cinerea*
- Dormilona fraile *Muscisaxicola flavinucha*
- Dormilona de frente negra *Muscisaxicola frontalis*
- Dormilona tontito *Muscisaxicola malcoviana*
- Dormilona chica *Muscisaxicola maculirostris*
- Dormilona de nuca rojiza *Muscisaxicola rufivertex*

Reptiles

- Chilean Short Tail Snake (*Tachymenis chilensis*) Vulnerable, Endemic
- Chilean Long Tail Snake (*Philodryas chamissonis*), endemic and vulnerable

Many species not mentioned or not detected in the EIS by AES Gener are endemic, of high biological value, endangered, and/or beneficial to humanity. The Puma, the Lesser Grison, the Vizcacha, and the Chinchilla Rat, to name but a few, are listed for conservation as vulnerable species. Over 27 species have been omitted, leading us to question to methodology employed. Survey activities consisted of only 4 days spent in the field, 2 days in spring and 2 days in the fall - which is clearly insufficient, considering that some species are migratory, some are scarce, and others are very difficult to spot and to detect from their tracks and spoor.

Additionally, certain sites located close to the project's planned work areas are key locations for the survival of vulnerable species, such as the Caiquén (*Chloephaga picta*), which is found in the highlands of the Maipo Basin, as the northernmost point of its nesting range. A key aspect in terms of focusing wildlife conservation efforts is to understand the mechanisms that lead populations to diminish and to become extinct - mechanisms that the company has not taken into account. We are surprised at the certainty with which it is stated that the project shall not lead to decline in populations or cause negative effects on biodiversity. Key wildlife species that would be directly affected by the project include:

The Torrent Duck (*Merganetta armata*), an iconic bird of the rivers that flow through the Andean foothills, which lives year-round in the waters of the Maipo River. This is a very little-known but valuable bird, that merits attention and protection. It is a bird that is specialized for river habitats in mountainous Andean areas, being typically found in wide, fast-flowing rivers. The species is not adapted to live in creeks or small streams with lower flow rates, and it does not inhabit stagnant water. Additionally, the survival of the invertebrates on which it feeds is dependent on the flow rate. The future of this species depends on the protection of its habitat, and this project has ignored it. It was in this way that the hydroelectric dam on Chamiza River, in Region X of Chile, affected the local distribution of torrent ducks. Previously the species was seen there, but now it is not. Many of the factors that affect this species also affect the other duck species that inhabit the area.

The Cururo (*Spalacopus cyanus*) is a species of rodent that is endemic to Chile, and its conservation status is listed as endangered. Its behavior includes burrowing and living in complex tunnel systems with galleries, in soil that has plants with edible roots and bulbs growing in it. It is important to point out that this species is able to move through the protected area known as the Cascada de las Ánimas, located within the Sanctuary, which provides care and protection for a large number of individuals confiscated by the SAG. The Nature Sanctuary has been protected in the past by the natural barrier formed by the Maipo River, the fast flowing waters of which have protected the Sanctuary from illegal hunting, uncontrolled habitat damage, and theft of individual animals from the Wildlife Refuge. The theft of wildlife from rescue centers is not a minor issue, and the CODEFF rescue center has suffered losses as a result of such theft. A drop in flow rate will leave the Sanctuary unprotected, leaving its fragile wildlife vulnerable. In conclusion, this is not a feasible project for implementation in an area with such vulnerable, unique, and protected biodiversity as the Cajón del Maipo.

Universidad Andrés Bello

Thematic responses

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected

Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neoporteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Lilolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into

neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

F&F.02.02 Mitigation

Aquatic flora and fauna

The Project calls for a suite of multi-purpose environmental management measures that aim to minimize its effects on living organisms, including: minimization of watercourse areas to be subject to intervention by prioritizing such works for late summer and early fall seasons (period of lowest flow rates), the adoption of special precautions to prevent accidental spillages into watercourses (prohibition of the storage of lubricant drums in or near watercourses, etc), and permanent maintenance of ecological flow rates.

For more detailed information, including technical documentation that complements the information described above, see Annex 17 of the Addendum.

Terrestrial Flora and Vegetation

In order to prevent and/or minimize the Project's effects on plant life, it plans to adopt a number of integrative measures: micro-routing in advance of starting work on-site, in order to identify specimens of plants listed in any conservation category and subject to impact; compensation with the planting of 10 specimens for every one destroyed, in the case of non-woodland species listed for conservation; implementation of a woodland management plan applicable to woodland areas, which describes its measures in accordance with Article 5 of the Woodland Law; implementation of vegetation restoration plans at muck disposal sites, encampments, artificial slopes, and tunnel access terraces (EIS, Annexes 7 and 29). More in-depth information on complementary measures is provided in Annex 6 of Addendum 1.

Terrestrial fauna

Specific wildlife environmental management measures have been proposed for each particular species, taking into account prior experience in the success of these measures in similar projects. These measures will be implemented in continual coordination with the Servicio Agrícola y Ganadero. Principal measures include: capture of individuals belonging to species of conservation interest for rescue and relocation; controlled perturbation actions; and habitat replacement. Other measures are based on the use of signage, training for Contractors, and contractual requirements for on-site supervision (see details in Section 6.4.1.6 of the EIS).

See Annex 4 of the Addendum for the native wildlife rescue and relocation plan.

Remark N° 285

Alto Maipo Project Remarks

The Alfalfal II Plant is designed for a flow rate of 27 m³/s, receiving water from the streams located in the upper reaches of the Volcán River and Yeso River basins. In the Upper Volcán River Basin, it will capture a flow rate of 12.8 m³/s, to be added to 15 m³/s from the Yeso River - the latter representing an average annual flow rate (information from the EIS) of only 8.4 m³/s. The same applies to the streams located in the Upper Volcán River Basin, where the Las Placas stream is located, from which plans call for the abstraction of up to 1 m³/s with an average annual flow rate (Q_{ma}) of 0.47 m³/s, the La Engorda with a maximum of 2.1 m³/s and a Q_{ma} of 0.99 m³/s, the Colina Stream, from which a peak flow rate of 6 m³/s will be taken, with a Q_{ma} of just 3.24 m³/s and finally, the El Morado Stream, with a peak flow of 7 m³/s and Q_{ma} of 1.71 m³/s. This calls into question the possibility of generating the required electrical power from this plant and the Las Lajas Plant, which will make use of the same water flow.

The Las Lajas Plant is designed for a peak flow rate of 65 m³/s, receiving its input from the discharge pipes of the Alfalfal and Alfalfal II Plants, as well as additional water from the middle reaches of the Colorado River. These figures suggest that there will be a shortfall in water availability, and a consequent reduction in electrical energy generation.

A number of different methodologies are used to determine the ecological flow rates proposed by the DGA, to wit:

Qeco = 10% of annual average flow rate.

Qeco = 50% of minimum low water flow rate in 95% of years

Qeco = Flow rate that is exceeded on at least 330 days of the year = Q₃₃₀

Qeco = Flow rate that is exceeded on at least 347 days of the year = Q₃₄₇

The DGA is also empowered to reserve ecological flow rates of up to 20% of average annual flow rate, and, in special cases, even up to 40%.

The project documentation mentions that the Colorado River, upstream of its confluence with the Maipo River, has an average annual flow rate of 32.7 m³/s, which the annexes mention a figure of 31 m³/s. The Project establishes an ecological flow rate of 0.6 m³/s, which will be maintained for approximately 7 months of the year. This does not correspond to any of the methodologies listed above.

As stated in the EIS "plans call for a total of 5 encampments, including site installations, each with an approximate workforce of 200 to 400 employees, amounting to a total of 2000 persons on average, with peak hiring standing at 2500". If the workforce housed at each encampment is 200 to 400 persons, it seems difficult to arrive at an average of 2000 employees.

The project includes the extraction of inert material, wet rock and crushed rock extracted from the tunnels, referred to as "Muck". It will be disposed of in muck disposal heaps that are part of the project. The estimated volume mentioned in project documentation is 1.7 million m³, but later in the documentation, in the Muck Management Plan, a figure of 2.75 million m³ is mentioned. Furthermore, no mention is made of any analysis of this material, and its possible subsequent leaching leading to contamination. The monitoring program documentation does not mention the frequency with which potential leaching will be observed, of specific sites where observations and/or testing will be conducted; similarly, it does not mention for how long this monitoring will be conducted. Tests for acidic drainage are mentioned, but once again the frequency of such testing, and the specific sites where it will be conducted, are not mentioned. With regard to industrial waste produced, which the project documentation states will comprise "waste oil and lubricant grease": The reuse and/or sale of this material to third parties will be prioritized, and such substances may be gathered on a temporary basis at specially prepared storage sites, for subsequent removal and disposal at authorized disposal sites, transported there by companies authorized to transport such substances". No mention is made of the characteristics of these temporary storage sites, to prevent spillages and the contamination of soil, surface water, and groundwater.

Project documentation estimates domestic waste production, at peak hiring levels, at a maximum of 2,500 kg per day. It is stated that such waste will be stored in containers and removed on a regular basis by the contractor, for subsequent disposal at an authorized disposal site. No mention is made of the frequency of waste removal, to prevent the buildup of disease vectors and focal points of contamination.

The report makes no mention of special treatment for plant and vegetable waste, for which we propose a waste stabilization treatment using composting, for subsequent use in improving soils affected by the project.

The project documentation mentioned that before starting construction activities, a population and habitat condition study will be conducted for the frog *Alsodes nodosus*; *Spalacopus cyanus* (cururo) and for *Merganetta armata* (torrent duck). Additionally, it would be advisable to include the following amphibian species that are suffering from conservation problems: *Telmatobius leavis* and *Bufo espinulosus*. The district is also home to endemic reptiles that are suffering from conservation problems and that exist in areas where the project will be implemented, such as *Pristidactylus volcanensis* and *Liolaemus gravenhorsti*.

The Vegetation Restoration Plan, in the annexes, mentions that "the localization of sites for vegetation restoration measures will be determined by the specialist, ruling out areas where natural restrictions lead to little or no plant cover, and where existing soil conditions are unsuitable for the desired level of plant take-up." At the very least, the restoration of pre-existing vegetation in these areas should be ensured, with soil improvement conducted if necessary.

The Vegetation Management Plan establishes reforestation actions in areas with different uses, using exotic species such as eucalyptus and European Peumo, creating a negative environmental and landscape impact.

Benjamín Astorga Leiva

Cascada de las Ánimas

Thematic Responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of

them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

F&F Biodiversity Impact

Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3**, and **Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neopteris curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo Spinolosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Liolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopietes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

F&F.02.02 Form of mitigation

Aquatic flora and fauna

The Project calls for a suite of multi-purpose environmental management measures that aim to minimize its effects on living organisms, including: minimization of watercourse areas to be subject to intervention by prioritizing such works for late summer and early fall seasons (period of lowest flow rates), the adoption of special precautions to prevent accidental spillages into watercourses (prohibition of the storage of lubricant drums in or near watercourses, etc), and permanent maintenance of ecological flow rates.

For more detailed information, including technical documentation that complements the information described above, see Annex 17 of the Addendum.

Terrestrial Flora and Vegetation

In order to prevent and/or minimize the Project's effects on plant life, it plans to adopt a number of integrative measures: micro-routing in advance of starting work on-site, in order to identify specimens of plants listed in any conservation category and subject to impact; compensation with the planting of 10 specimens for every one destroyed, in the case of non-woodland species listed for conservation; implementation of a woodland management plan applicable to woodland areas, which describes its measures in accordance with Article 5 of the Woodland Law; implementation of vegetation restoration plans at muck disposal sites, encampments, artificial slopes, and tunnel access terraces (EIS, Annexes 7 and 29). More in-depth information on complementary measures is provided in Annex 6 of Addendum 1.

Terrestrial fauna

Specific wildlife environmental management measures have been proposed for each particular species, taking into account prior experience in the success of these measures in similar projects. These measures will be implemented in continual coordination with the Servicio Agrícola y Ganadero. Principal measures include: capture of individuals belonging to species of conservation interest for rescue and relocation; controlled perturbation actions; and habitat replacement. Other measures are based on the use of signage, training for Contractors, and contractual requirements for on-site supervision (see details in Section 6.4.1.6 of the EIS). See Annex 4 of the Addendum for the native wildlife rescue and relocation plan.

MAR Muck

The PHAM plans to construct approximately 70 km of tunnels. The excavation of these tunnels will generate inert material consisting of wet rock and crushed rock, known as muck, as well as

smaller quantities of inert material produced in road building and the construction of buried conduits.

This muck material will be deposited in the 14 muck disposal heaps that the Project plans to create. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria. For more information, please see **Annex 6 of the EIS** and **Annex 3 of the Addendum**.

MAR.01 Regulations

The Project Owner has made available a Management Plan for "Project Muck Disposal Heaps", which contains information on the technical, environmental, and safety specifications of the heaps, as well as recommendations

contained in the Ministry of Public Works' 2004 Environmental Management Plan Manual for Works Subject to Concessions. In particular, the Plan establishes the environmental considerations adopted for the operation of the muck disposal heaps, to be implemented during the construction of tunnels and roads under the PHAM.

In order to comply with the environmental management measures contained in the EIS, an Environmental Monitoring Program will be conducted, with the aim of verifying the effectiveness of these measures and compliance with them. For details on the principal actions included in the Monitoring Program, and for the various stages of functionality of the muck disposal sites, see

Annex 6 of the EIS and **Annex 3 of Addendum 1**.

For more information on the specific regulations applicable to the Project, and compliance therewith, see **Chapter 3 of the EIS**.

MAR.02 Location

The PHAM calls for the creation of 14 muck disposal heaps, for the disposal of waste material from tunnel boring and smaller quantities of inert waste from the construction of roads and buried conduits. Maps of the muck disposal heaps, and a copy of the muck disposal heap management plan, are included in Annex 6 of the Project EIS. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria.

From a technical and safety perspective, the muck disposal heap sites have been located as close as possible to exit points from tunnels and to surface work sites, in areas not at risk to landslides or landslip events.

The following aspects have been taken into account as environmental criteria in site selection: Sites have been selected that are distant from any settlements or any housing used on a permanent or temporary basis.

Priority has been given to selecting sites with low visual impact - that is, in areas that are distant from potential observation points on public highways or high ground.

In the Project area's higher elevation regions, the disposal heaps have been sited up against natural topological features, such that the emplacement of the heaps' layers forms a continuation of the general landform structures of the area.

In general these are areas that are of low value as a habitat for plant life (soils with usage capacity ratings V, VI, and VII), and efforts have been made to avoid modifications to the original land form structures present or to surface watercourses.

Surface surveys have been conducted in all of these regions, as details in **Section 5.8, in Chapter 5 of the EIS**, to rule out the presence of sites of archeological and/or paleontological value at the muck disposal heap sites.

For more information, see **Annex 6 of the EIS** and **Annex 3 of Addendum 1**.

MAR.03 Characteristics

The material to be deposited in the muck disposal heaps will be inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of waste material produced in road building and the construction of buried conduits. It is expected that a total of 1.7 m cubic meters of TBM muck will be produced.

The total volume of material to be disposed of is estimated at 2.7 m cubic meters, including uncompacted rock and soil; this material will be disposed of at the 14 muck disposal heap sites planned under the PHAM. Maps of the muck disposal heaps,

and a copy of the muck disposal heap management plan, are included in Annex 6 of the EIS.

The waste material produced through tunnel excavation, road building, and construction of buried conduits during the construction phase will be deposited in a series of layers forming terraces. The muck disposal heaps will be built up in an organized manner, forming level and safe platforms, with slopes at the sides with the natural gradient formed by the material in question, thus ensuring stability and permitting adequate drainage. All of these design features are in conformity with the muck disposal heap construction method and environmental measures indicated in **Section 4.2 of Annex 6 of the EIS, and Annex 3 of Addendum 1**.

Finally, the filling will be covered with 20 cm of organic soil, permitting the definitive finishing of the spoil heap.

Management and restoration techniques for the 14 muck disposal heaps are indicated in Annex 29, "Restoration Plan", which includes information on surface treatments.

MAR.04 Impact

All of the measures adopted for the creation, operation, and abandonment of the muck disposal heaps will be implemented by the Works Contractor. Gener will undertake an environmental monitoring plan addressing the management and usage of the sites, which will include site inspections and periodic review of site entry records.

Rainwater will be managed using specially designed channeling works, the details of each of which are indicated in the plans attached in Annex 6 of the EIS.

The Project Owner's reiterates its commitment to undertake an exhaustive program to rescue low mobility fauna in the area of direct influence of PHAM works (including the area to be occupied by the 14 sites where muck, spoil, and earth will be disposed of in heaps). This wildlife rescue will require the application of capture techniques suitable for small mammals, reptiles, and amphibians. **Annex 4 of Addendum 1** presents the Wildlife Rescue and Relocation Plan.

Even following surveys ruling out the presence of archeological or paleontological sites or finds in the muck disposal heap sites, the PHAM also includes a series of measures designed to prevent any intervention in sites with heritage value, with the implementation of restricted areas and training programs for contractor personnel. For more information, see **Annex 14 of Addendum 1 and Annex 33 of the EIS, "Restricted areas"**.

The Project Owner indicates that most waste generated will be produced during the Project's construction phase. Two types of waste will be produced:

- **Solid waste:**
Construction waste such as wood, piping offcuts, rubble, wires, waste packaging, metals, etc.
Domestic waste or waste similar to domestic waste; plant waste such as remains of shrubs, weeds, and smaller quantities of tree waste removed from work sites.
- **Liquid waste:**
Applicable to the following activities: concrete production, washing and preparation of aggregates, and washing of truck chassis and load beds, machinery, and tools. Other liquid waste relates to wastewater from bathrooms, showers, canteens, and other activities conducted within encampments and site installations.

Gener will place strict contractual requirements on Contractors during the construction phase, aiming to ensure suitable management and final disposal of waste. Additionally, contractors and subcontractors shall agree to comply with regulations and oversight actions established by Law, to be applied to all works of this nature. The planned environmental management manual will prevent the occurrence of any pollution events linked to the Project (**see EIS, Annex 18**).

RES.01 Regulations and Responsibilities

In order to ensure the efficient, safe, and responsible treatment and management of waste matter generated by the PHAM an additional plan has been developed, the "Waste Management Plan for Work Sites, Works Installations, and Encampments", describing the procedures and equipment necessary for the management and disposal of waste produced during the construction of the Project, and which also specifies the responsibilities required under its implementation, what records must be kept, and what reports must be prepared for the purposes of control and oversight (Annex 18 of the EIS).

Gener will enforce implementation and compliance with the Project's environmental measures during construction management, placing strict contractual requirements on Contractors with the aim of ensuring suitable management and final disposal of waste. **RES.02 Location**

a) Handling of solid waste

Infrastructure for the integrated management of solid waste throughout the life of the Project, addressing the full gamut of temporary storage, preparation, and classification for transport, will comprise: waste collection and storage sites at the point where it is generated; areas for non-hazardous waste; and an area for hazardous waste. These waste storage areas, for non-hazardous and hazardous waste, will be located as shown in tables 5.1.1 (pages 7 and 8) and 5.3.1 (pages 11 and 12) in Annex 18 of the EIS, respectively.

Domestic waste and organic waste similar to domestic waste will be disposed of in a sanitary landfill site, while construction waste other than rubble and domestic waste or organic waste similar to domestic waste will be sent to the waste management area for classification, where materials with potential residual value will be returned for reuse or recycling, and the remainder will be dispatched to a sanitary landfill site (Annex 18 of the EIS, page 6).

b) Handling of liquid waste

• **Wastewater**

Wastewater produced in encampments will be subject to primary and secondary treatment, provided by installing modular activated sludge treatment plants at each encampment. These systems are based on unitary operations, with units designed and equipped to treat wastewater input such as to attain a level of purity sufficient for discharge or reuse with no associated risks to persons or to the environment, in full compliance with the regulations stipulated in Supreme Decree 1-90.

Wastewater generated at work areas, through the use of chemical bathrooms, will be transported to by the contractor in wastewater transport trucks to authorized sites for subsequent treatment.

Sludge generated through wastewater treatment will be removed by the works contractor for transport and disposal at authorized sites on a weekly basis. The sludge will be removed in wastewater transport trucks, and in accordance with the volume of sludge produced it is expected that each encampment will require 2 to 3 journeys by 6 m³ capacity wastewater transport trucks per week, throughout the construction phase. Meanwhile, during the operations phase, the project will use the existing installations at the existing Alfalfa Plant Control Room, with no requirement to install a new wastewater treatment system, and thus not producing the sludge that such a system would generate.

For more information, see **Annex 18 of the EIS**.

• **Liquid industrial waste**

In view of the characteristics of this type of wastewater, the project plans to install a sequential sedimentation system. In view of this situation, a settling pond will be installed at each work site to permit the separation of liquid industrial waste into clear water and settleable sludge.

(see **Annex 5 of Addendum 1**)

RES.03 Characteristics

The types of waste to be produced during the construction phase, and the characteristics thereof, are as follows:

Characteristics of solid waste

Solid non-hazardous waste

This class of waste includes:

- Construction waste: consisting of wood, piping offcuts, rubble, wires, waste packaging, metals, empty cans and drums used to transport paint and adhesives, and other similar items.
- Domestic waste and other waste similar to domestic waste: basically includes leftover food from canteens, packaging, paper, card, and similar materials.

- Plant waste: consisting of remains of shrubs, weeds, and smaller quantities of tree waste removed from work sites.

Hazardous solid waste

Types of hazardous waste produced by the Project correspond to waste generated

in workshops, storage areas, and work sites, such as:

- Solvents
- Oil waste
- Lubricating grease
- Batteries
- Oil filters

Characteristics of liquid waste

Wastewater

This class of liquid waste relates to wastewater from bathrooms, showers, canteens, and other activities conducted within encampments, site installations, and work sites. This wastewater will be subject to primary and secondary treatment, provided by installing modular activated sludge wastewater treatment plants at each encampment.

Liquid industrial waste

Liquid industrial waste shall be generated only through the following activities: concrete production, washing and preparation of aggregates, and washing of truck chassis and load beds, machinery, and tools.

As a result of this fact, this type of liquid waste shall be generated only at work sites.

Meanwhile, wastewater shall not be produced at the Project's encampments, as these areas shall be used only for personnel lodgings.

For more information, see **Annex 18 of the EIS**.

RES.04 Impact

Gener considers the suitable handling of waste produced by the Project to be of particular importance, and to this end it has designed rigorous programs for the handling, collection and storage, transport, and final disposal, reuse or sale of the different forms of waste that shall be generated at the Project's encampments and site installations, as well as its work sites. These programs have been designed specifically taking into account the particular features of the area where the Project is to be implemented, as well as regulations in force and the requirements imposed by the authorities during the Project's environmental evaluation. In general this category includes non-hazardous waste produced during construction activities and from domestic sources (the latter at workers' encampments), and production of this waste will cease at the end of the construction phase:

- Liquid waste will be reused or disposed of in compliance with applicable sector regulations. All discharge of treated wastewater will be conducted at isolated points, generally without the presence of other human use and with low physical and visual accessibility.
- For both hazardous and non-hazardous waste, the Project Owner plans to transport material for disposal in authorized sites, eliminating the possibility of creating centers of soil or water contamination that might have a negative effect on the quality of the area's scenery. The storage areas, rubble, and other materials stored on a temporary basis within site installations shall be removed once construction activities have been completed, and therefore shall have no impact on the landscape.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.02 Human contingent presence

The presence of Project employees will be temporary (limited both to the years of the construction phase, and to the working day organized into shifts), thus disincentivizing them and their families from moving to the area on a permanent basis. During the Project's construction phase, its employees shall sleep in the encampments described in the documentation, not making use of existing hotels and hostels located in and near the area's settlements.

Once the construction phase has been completed, the Project's installations and encampments shall be removed; they shall therefore not become part of existing settlements, or form new centers for the formation of settlements.

The PHAM plans call for the creation of 5 encampments, located away from settlements.

These encampments will be operated as described in Annex 33, and each will house a permanent contingent of 200-400 employees, under the standard working regime adopted by mining installations. The transport of employees from the encampments to their places of residence shall have a frequency determined in accordance with the working shifts.

Therefore, it is important to

understand that under no circumstances shall the presence of Project employees in the area lead to the type of interaction with the resident community and demand for local services that currently occurs as a result of the flow of tourists and visitors, mainly during weekends, holidays, and the summer season.

In view of the above, the Project shall not lead to the following potential impacts:

overpopulation at a local or district level (in existing settlements); or effects modifying local customs, economic service provision activities, connectivity, and local load capacity (understood to refer to the load placed on infrastructure and equipment).

As indicated in Annex 39 of the EIS, documentation supporting the analysis described above shall form part of activities under the Social Indicator Monitoring (SIM) program. This monitoring program is based on compiling information using qualitative and quantitative techniques developed in the field of Social Sciences, oriented towards investigating a suite of indices that pay due heed to trends in relevant variables for monitoring, selected

in accordance with the characteristics of the Project and of the communities in the area where it is to be implemented.

Remark N° 287
Alto Maipo Hydroelectric Project

The project is unacceptable from the perspective of the usage of water owned by residents of the area for the benefit of the hydroelectricity company.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS**.

This section presents information characterizing the basins and tributaries of the Volcán, Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex

13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS**.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this

research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfafal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly

frequented, minimizing their visual impact.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. In parallel,

the study investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

Remark N° 288 Environmental Impact

I believe that the beautiful surroundings of the Cajón del Maipo, which has been declared a "Natural Reserve of International Interest", would lose their attractiveness for tourism - and the Law on Free Commerce and the Protection of the Andes.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents. TUR Tourism Scenery**

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

Remark N° 289 Financial Interests

The PHAM will make use of the existing Alfalfal installations for its hydroelectric plant solely to turn a profit, without a care for environmental harm to the Cajón del Maipo.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water,

which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly

frequented, minimizing their visual impact.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

Remark N° 290 Water Usage

This will affect the entire valley, as it will affect all plant and animal life and all those who love nature.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

ivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Qe) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

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F&F Biodiversity Impact Flora and Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles, 70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of species affected Aquatic flora and fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempeo Stream, and

the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neopterteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo Spinolosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Liolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

F&F.02.02 Form of mitigation

Aquatic flora and fauna

The Project calls for a suite of multi-purpose environmental management measures that aim to minimize its effects on living organisms, including: minimization of watercourse areas to be subject to intervention by prioritizing such works for late summer and early fall seasons (period of lowest flow rates), the adoption of special precautions to prevent accidental spillages into watercourses (prohibition of the storage of lubricant drums in or near watercourses, etc), and permanent maintenance of ecological flow rates.

For more detailed information, including technical documentation that complements the information described above, see Annex 17 of the Addendum.

Terrestrial Flora and Vegetation

In order to prevent and/or minimize the Project's effects on plant life, it plans to adopt a number of integrative measures: micro-routing in advance of starting work on-site, in order to identify specimens of plants listed in any conservation category and subject to impact; compensation with the planting of 10 specimens for every one destroyed, in the case of non-woodland species listed for conservation; implementation of a woodland management plan applicable to woodland areas, which describes its measures in accordance with Article 5 of the Woodland Law; implementation of vegetation restoration plans at muck disposal sites, encampments, artificial slopes, and tunnel access terraces (EIS, Annexes 7 and 29). More in-depth information on complementary measures is provided in Annex 6 of Addendum 1.

Terrestrial fauna

Specific wildlife environmental management measures have been proposed for each particular species, taking into account prior experience in the success of these measures in similar projects. These measures will be implemented in continual coordination with the Servicio Agrícola y Ganadero. Principal measures include: capture of individuals belonging to species of conservation interest for rescue and relocation; controlled perturbation actions; and habitat replacement.

Other measures are based on the use of signage, training for Contractors, and contractual requirements for on-site supervision (see details in Section 6.4.1.6 of the EIS).

See Annex 4 of the Addendum for the native wildlife rescue and relocation plan.

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

SUE.02 Soils, meadows, and wetlands

The Project Owner has conducted a number of studies with the aim of characterizing the vegetation of summer grazing areas (La Engorda) (see details in Addendum 1, Annex 6, and in Chapter 5 of the EIS), as well as flora and vegetation studies in the Project's area of influence (EIS, Chapter 5).

These studies contain information compiled in fieldwork campaigns conducted in Fall 2005, Spring 2006, November 2007, March 15 and 16, 2008, and September 2008, which add to the body of knowledge available regarding vegetation in these areas.

The Lo Encañado area shall be assigned a status of controlled access area for works contractors at all times: it shall not be subject to any intervention whatsoever. For more information on vegetation areas that could be affected by the construction works, and to learn about mitigation measures proposed by the Project Owner, you are advised to review Annex 42 of the EIS and Annex 6 of the Addendum.

With regard to environmental regulations that apply specifically to vegetation and plant life, the Project Owner shall be subject to: **Supreme Decree 366** (Exploitation of Tamarugo, Carob, Chañar, Guayacán, Aextoxicon, Charcoal, Acacia, Boldo, Maiten, Litre, Bollen, and Quillay). This legal instrument governs the felling of trees and bushes.

Supreme Decree 4363 and D.L 701 (Approving the Definitive Text of the Law on Woodland and Regulations on Forest Promotion).

Article 2 of the Woodland Law establishes an obligation that land classified as for preferential woodland land use, as well as natural and artificial woodlands, are subject to woodland management plans approved by the National Forestry Commission (CONAF). Furthermore, Article 21 of Decree Law 701 establishes that any felling or usage of native woodland shall be subject to the CONAF's prior approval of the corresponding management plan.

Decree 82 (Prohibiting the Felling of Trees and Bushes in Indicated Andean High Mountain and Foothill Areas)

Article 102 Sector Environmental Permit (Permit for the felling or exploitation of native woodland, in any type of land, or plantations located in land with preferential characteristics for woodland use).

For further information and analysis on the aforementioned regulations and permits, as applicable to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see Sections 3.2.6 and 3.3.7 in Chapter 3 of the EIS.

Remark N° 291
Government

It is the duty of the government to protect natural resources, and not allow environmental conditions to be altered irreversibly.

Thematic responses

OTR Other

This section relates to certain special situations that could not be categorized, or that are linked to specific requests, disqualifications, or situations that feature a clear political component, against either the environmental authority or the Project Owner.

OTR.02 CONAMA

Remark N° 299

Impact on Production Activities: Tourism

What plans exist for the mitigation of the impact that the project shall cause for tourists during the operations phase, through increases in journey times or increased waiting periods at intersections? The project owner should calculate the percentage of Santiago residents who regularly visit the Maipo Valley and who shall stop visiting as a result of annoyances caused by the project.

How will people who are in the business of working for tourists and selling them things make a living? Why doesn't AES Gener hire them to feed their personnel with local baked goods?

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term

mutually beneficial relationships between the project and its surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.04 Fostering tourism in the area

From the perspective of the natural vocation of the district of San José de Maipo, tourism is a sector with growth potential, which must be addressed in an integrated manner and with an eye on the long term. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal operations.

The company will spearhead the development of a **Tourism Promotion Program**, particularly focusing on **Ecotourism**, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives coming from local providers in the sector. The Project Owner will produce a **website** and editorial work, as well as the design of the first **edition of a tourist guide** for international visitors (bilingual), printing 5000 copies to support outreach and awareness building of the District of San José de Maipo as a national tourism resource.

Plans have also been drawn up for the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc., and the provision of **training in local tourism liaison for local residents**. **SOC Socio-Economic Impact**

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.04 Impact on economic activities in the area

Economic activities not linked to the primary sector have been identified, characterized, and evaluated, leading to an estimate of the project startup's impact on these activities. In terms of formal and informal activities related to recreational activities such as mountain climbing, tourism, camping, etc, the study specifies all trails used and the periodicity and seasonality of activities, providing background information on services offered or access to the natural environment for group or individual use linked to the education service. Further detail on mountain sports tourism is available in Annex 35 of the EIS, "Complementary survey of tourist attractions and tourism services in the District of San José de Maipo", and Annex 36 of the EIS, "Survey of high mountain activities".

In the context of the increased economic activity generated in the district through the situation of near-total employment, and enhanced development of services associated with the construction of the project, significant efforts were made to assess consequent reduction or loss of income through these activities.

A major issue addressed in the study was the determination of the periodicity of livestock and tourism activities, identifying how these will continue in areas where project works are undertaken or alongside these areas, during the construction and operations phases. In parallel, the study investigated possible increases in journey times between geographical points frequently used by formal and non-formal groups, as well as individuals, relating to livestock activities, tourism, and adventure sports.

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

TUR.02 Tourism impact

Impacts on tourism activities relate to potential annoyance caused to the users of public highways due to the movement of vehicles and the presence of work sites and works installations. It is expected that these impacts shall not be significant in terms of disincentivizing tourism and visits to the area. In the strictest terms, there shall be no interruption of activities themselves, or any deterioration in the tourism-related features of the area.

Given that most works are to be located underground and in high mountain areas, a "mining-style" working day shift pattern is to be used, which, combined with the suspension of project-related traffic flow during weekends as well as other measures designed to minimize impacts on traffic, shall ensure that any interference with tourism activities caused by the impact of the PHAM shall be of a low level of significance.

In view of the nature of activities under the operations phase of the PHAM, these activities are expected to have no impact on tourism activities (**see Chapter 6.4 of the EIS**).

Additionally, the Project Owner has proposed that is implement a program to incentivize tourism business development in the area:

Support for tourism business development

Gener has taken on a firm commitment to make use of its Maitenes Foundation (Annex 26 of the EIS) to make a concrete contribution to tourism promotion, as the sector shows major growth potential that must be addressed from an integrated perspective and adopting a long-term vision. As specified in the baseline study report, small tourism companies are present in the district, providing services with limited resources and on a small scale, or in totally informal

operations. Under this approach, the company will spearhead the development of a Tourism Promotion Program, focusing particularly on Ecotourism, leveraging present experiences but most of all providing training, advisory services, and partial financing for new business initiatives

coming from local providers in the sector. This approach includes the possibility of improving tourism infrastructure, such as hiking trails, mountain refuges, signage, etc.

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayes, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions. The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS**.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

VIA.03 Congestion

When PHAM Project construction activities begin, there will be an increase in road traffic movements in the immediate surroundings of the work area. This vehicle movement will be related mainly to the transport of supplies and machinery to the works installations, transport of excavation spoil to muck deposition sites, and, to a lesser extent, the transport of personnel to the work sites. For more information on traffic flow increases resulting from the Project, see **Chapter 2, section 2.4.1, part E, Annex 14 of the EIS, and Annexes 9 and 14 of Addendum 1**.

The PHAM highway impact analysis takes into account all works and activities under the Project, including the transport of supplies, machinery, and personnel. According to modeling studies conducted,

it is predicted that there will be no significant impact on highway usage (levels of saturation of new and existing roads and intersections). For more information on the Project's road operations, measurements used and models derived, see **Annexes 9 and 15 of the Addendum**.

Additionally, increases in noise emissions are analyzed in **Section 6.4.1.2 of the EIS**.

Notwithstanding the above, it is assumed that, given that certain construction activities shall be conducted at the same times that other road users wish to make use of certain sections of specific roads, a certain level of annoyance may be caused, and for this reason the PHAM has adopted a number of control and mitigation measures, indicated in **Chapters 6 and 2 of the EIS** and in **Annex 14 of the EIS, as well as Annexes 9 and 17 of Addendum 1**.

It is considered likely that, in view of the predominance of the tourist industry in the local economy of the district of the Maipo Valley, a certain level of annoyance may be caused at certain points and at specific moments, mainly due to conflicts between PHAM road usage and the movements of visitors. As indicated in the EIS Baseline Study, this is an area where tourists come to enjoy walks and peace and quiet, on weekends and holidays. In particular, there are 2 specific tourism attractions located in the same areas as site installations: the El Yeso and the Alto Volcán area, where special measures shall be taken, as specified in **Chapter 6 of the Project EIS**. Additionally, **Annex 32 of the EIS** specifies emergency procedures to be adopted in the event of transport accidents caused by project vehicles.

Remark N° 300 Locally Held Water Rights

The Project Owner should demonstrate that it holds the water rights necessary to run the project during all phases, thus ensuring that it will not affect water rights held by third parties.

The Project Owner should clarify whether the surface water flow in the El Manzano Stream will be affected. The settlement of El Manzano does not have a regular supply of drinking water, and residents are often forced to use irrigation water instead. If the flow rate in the El Manzano Stream is reduced, it will become more difficult to capture water to supply to irrigation users.

The Project Owner should clarify whether the flow rate in the Maurino Channel will be affected, and how this will affect irrigation users.

These watercourses should be incorporated into the plan for mitigation, restoration, and/or compensation measures.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see **Table 2.3.4 in Chapter 2 of the EIS.**

AGU.02.01 Irrigation

The main irrigation channels that draw their water from the Maipo River in the Project's area of influence - that is, in the first section of the river - are fed from intakes located near the Sirena Channel intake, located approximately 4.5 km upstream of the Independent Intake owned by the company Aguas Andinas, located in the Las Vertientes area. In view of the above, and considering that the point where the Project will return its water to the river system (Las Lajas area) is located upstream of the La Sirena Channel intake, it can be stated with confidence that the PHAM shall not affect the availability of water resources used for irrigation.

All works shown in the layout map included in **Chapter 5, Section 5.6.1.2, part c** are located upstream of the point where the Project will return its water to the river (Las Lajas area); this plan shows the results of the field survey conducted upstream of the PHAM discharge in the Las Lajas area, indicating all intake, channel, well, and other facilities for water abstraction in the El Volcán area, and the point where water will be returned by the Project

to the river system. This information was sourced from the DGA Water Resource Information Center (map of intakes in the first section of the Maipo River, 1988), with on-site verification conducted in 2008.

The Project, making use of its legally-constituted water rights, shall not affect the current functioning of the channels, and channel users shall therefore not suffer detriment in making use of their own rights.

With regard to reductions in water flow rates in the river, and in accordance with observations made and studies conducted, these users (particularly in the cases of the Manzano and Maurino Channels) are not expected to experience any problems in capturing their water resources. During its construction phase, the Project plans to conduct a study to recommend a solution for the modification of the intakes of these two channels, and then to implement these recommendations (see **the Addendum, Section I, Question 40**)

AGU.02.02 "Hanging" channels

Gener has repeatedly issued declarations that it is aware that not only the works that it shall construct, but also the usage that it shall apply to in-stream water rights that it holds, shall have no effect whatsoever on the legitimate rights that various water user communities hold and make use of at the intakes of the channels that they possess and use to abstract water, over which they hold end user rights.

In view of the above, Gener maintains that it shall proceed to implement works to modify existing intakes within the Project's area of influence, such that the corresponding user communities can continue to make use of their water rights, with no impairment of any kind.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.04 Monitoring and control of flow rates and water levels

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but

also biological information necessary to

preserve the aquatic organisms associated with the watercourses. Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán	Stream gauge station	6,259,100
	406,157		
	La Engorda Stream Bridge		
Alto Volcán	Rain gauge station	460,487	6,358,143
	El Volcán River Bridge (Volcán South)		
Alto Volcán	Control station	407,468	6,259,751
	La Engorda Intake		
Alto Volcán	Control station	406,780	6,260,782
	Las Placas Intake		
Alto Volcán	Control station	407,181	6,260,081
	Colina Intake		
Alto Volcán	Control station	405,768	6,261,231
	El Morado Intake		
Yeso River	Rain gauge station	391,504	6,262,449
	PBN (15)		
Yeso River	Control station	399,666	6,272,077
	El Yeso Intake		
Colorado River	Rain gauge station	380,449	6,287,261
	El Sauce		
Colorado River	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

PRO.01.01 Compensation

The concept of compensation refers to the act of indemnifying damages or harm caused. Within the framework of the EIS, the Project Owner has issued a proposal to the competent authority regarding a suite of environmental management measures aiming to minimize, compensate, and restore the Project's impacts, making their implementation sustainable (Chapter 6 of the EIS).

In this regard, compensation is understood to be included in the spirit or end goal of the environmental management measures proposed by the Project Owner, following the evaluation of the direct and indirect effects of the PHAM on each of the environmental components stipulated in Supreme Decree 95, SEIA Regulations.

Remark N° 301 Residents at Work Sites

The Project Owner should specify the exact locations of the work sites. The Project Owner possesses land in El Manzano, as well as a road to the mountains. It should clarify what use it intends to put these holdings to during the project's construction and operations phases.

Will the Project Owner install a work site in the settlement of El Manzano? Will it increase vehicular traffic in the area?

Thematic responses

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

PRO.03.03 Encampments and works installations

For details on the creation of encampments and works installations, please see Chapter 2, Section 2.3.2.4 in the EIS.

For information on PHAM encampment and work site approach routes, see EIS, Chapter 2, Table 2.1.2,

For information on regulations, see Chapter 3 of the EIS and Annex 33, General Operating Regulations for Encampments and Work Sites.

For information on the management of waste produced at work sites and encampments, see Annex 18 of the EIS, "Site Installation Waste Management Plan".

For information on the discharge of treated wastewater, see Response 26 in the Addendum.

For information on human consumption of water at encampments and works installations, see Chapter 2, Section 2.3.2.4, parts b and i.

For an assessments of the impact of the creation of encampments and works installations, monitoring methods, and conditions, see Chapter 6 of the EIS.

RSG Risk

The Project Owner possesses a general risk prevention strategy that imposes certain measures on the Project during its different stages of advance. This strategy features the following components:

- a) Measures incorporated into the Project's engineering design.
- b) Systematic verification of compliance with applicable regulations
- c) Establishment of restricted areas
 - c.1) Area restricted due to their archeological, paleontological, or heritage value
 - c.2) Area of natural value that requires protection by the Project
 - c.3) Officially protected area.
- d) Expert supervision during construction
- e) Training regarding environmentally sensitive issues
- f) Internal risk management and accident prevention programs
- g) Separation of works installations and encampments

For further information on each of these points, please see **Chapter 7 of the EIS**, which specifies the **Environmental Management Plan**, the **Risk Control and Prevention Plan** designed for the Project, the safety measures to be adopted in light of the risks identified, and, finally, the **Accident control plan**, to be activated in the event of the failure of the preventive measures taken by the Project Owner. Furthermore, **Annex 32 of the EIS** presents the **Risk and Contingency Prevention Plan** for contractors.

RSG.03 Blasting

Excavation methods using explosives will be used for the excavation of a proportion of the tunnels involved in the Project. Other tunnels will be excavated using a Tunnel Boring Machine, as described in **Section 2.3.2.2 the EIS**. The surface points where blasting will lead to perceptible

effects are
located close to the entrances of the tunnels that are to be constructed using the

traditional drill and blast excavation technique (**Section 6.4.1.2 and Section 6.4.1.3 of the EIS, and Section 6, Question 26 in the Addendum**). At surface locations in areas where tunnels are to be excavated using the traditional method, no vibrations will be caused that could lead to risks of landslides, rock falls, and landslips resulting from the construction of the tunnels, because these excavation techniques will be used at a great depth below the surface. Noise from blasting will only be audible during the opening of the ends of the tunnels. Once inside the tunnels, excavation works (including detonations) will not be audible, and therefore will not constitute a significant source of noise, and audible blasting will therefore only occur while the ends of the tunnels are being excavated. It is estimated that there will be 2 or 3 detonations per day at each work site. Based on these levels, added to the background noise in each area, it was determined that noise will not rise above the maximum levels permitted under MINSEGPRES Supreme Decree 146/97. For more information on this topic, see **Section 6.4.1.2 of the EIS and Section 8.2.2 of the EIS**, which describe the noise and vibration monitoring program associated with the blasting activities, as established in **Section 6, Question 41 of the Addendum**.

It is important to point out that a controlled intervention will be completed in advance of blasting, consisting of the installation of work platforms, through the removal of vegetation and the rescue of individual plants and/or animals of conservation interest that present low mobility, limited populations, and endemism, and other characteristics of the project and the range of the species in question (see Annex 4 of the Addendum), in particular through the implementation of the "Wildlife Rescue and Relocation Plan".

Regarding the construction of the El Volcán Tunnel, located beneath the El Morado Monument, the depth of the tunnel will vary between 550 m and over 1500 m. No impacts are expected relating to vibrations reaching the El Morado Glacier. For more information, see **Addendum 1, Section 6, Response 13 and Section 1, responses 4, 5 and 6**.

With regard to safety measures planned applying to the handling and storage of explosives, specified in Annex 32 of the EIS, regulatory stipulations for risk prevention and emergency control are provided that will apply to all contracting of works and/or services by Gener, in compliance with the requirements set forth in Law 16,744, Article 66 part 2. See also **Addendum 1, Section 1, Question 35**.

VIA Roads

The traffic analysis presented in **Annex 14 of the EIS** confirms that no significant impacts are expected to affect existing traffic and highway conditions used for access to areas of interest for tourism, archeology, and natural beauty. For more information, see **Annexes 9 and 15 of Addendum 1**. The PHAM plans call for the construction of a total of approximately 31 km of service roads, as well as the maintenance and conservation of the service roads installed by the Project Owner, and existing public and private roads, throughout the works construction phase.

VIA.02 Roads

In view of the inaccessibility of part of the Project area, plans call for the installation of a total of approximately 31 km of new roads by the Project Owner, which will be used to access the work sites and for the transport of personnel, machinery, equipment, supplies, and spare parts that the contractor may require at the encampments, works installations, and work sites. The layout of the new service roads is presented in **Figures 2.2.2 to 2.2.10 of the EIS**.

The Project Owner also plans to conserve and maintain existing routes in the PHAM area of influence: Route G-25 (El Volcán area) and Route G-455 as far as the El Yeso Reservoir. It should be pointed out that the aforementioned road improvement activities are detailed in Annex 19 of the EIS; however, for Routes G-25 and G-455 these actions are subject to modification because the Metropolitan Region Highways Department possesses an engineering study for the improvement of Route G-25 (from the El Yeso Bridge to El Volcán); this body will therefore reach a mutual agreement with GENER on the definitive actions to be undertaken, with the signing of an Agreement between the parties.

As indicated in **Section 2.3.2.5 of the EIS**, regarding machinery to be used in road maintenance, plans call for one water tanker truck per work area (El Volcán, El Yeso, Alfalfal, Aucayas, and Las Lajas), working only during the summer season.

See **Response 1.42 in the Addendum**, containing tables summarizing road conservation actions. The Project's has been designed and engineered to include a suite of measures for the optimization of the construction of new roads; for further information on these measures, see **Chapter 2, point 2.3.2.5 of the EIS**.

With regard to potential impacts on tourism activities that could arise as a result of the Project's road construction activities, Annex 9 of the EIS contains a map, plotted at a suitable scale, showing the spatial linkages of sites of interest for tourism, archeology, and natural beauty in these areas, demonstrating that no interference will arise, due mainly to the following considerations:

- Most of the work sites are located in largely isolated areas.
- The PHAM Project Owner or contractor shall not block the access or movement of visitors or tourists.
- The PHAM's environmental management measures shall guarantee the protection of paleontological and archeological resources, and shall prevent any interference with tourism or leisure activities.

The Project is not expected to interfere with traditional livestock activities arising through Project traffic flow, road works, or the closure of access to certain high mountain areas. One specific exception to the above relates to works to be undertaken in the lower-lying areas of the La Engorda summer grazing area, where plans call for sequential intervention limited to the immediate surroundings of work sites, on a temporary basis. Annex 34, the "Project Area Ethnographic Study", presents detailed information on the routes and areas that are traditionally used, as well as the seasonality and conditions of usage.

VIA.03 Congestion

When PHAM Project construction activities begin, there will be an increase in road traffic movements in the immediate surroundings of the work area. This vehicle movement will be related mainly to the transport of supplies and machinery to the works installations, transport of excavation spoil to muck deposition sites, and, to a lesser extent, the transport of personnel to the work sites. For more information on traffic flow increases resulting from the Project, see **Chapter 2, section 2.4.1, part E, Annex 14 of the EIS, and Annexes 9 and 14**

of Addendum 1.

The PHAM highway impact analysis takes into account all works and activities under the Project, including the transport of supplies, machinery, and personnel. According to modeling studies, it is predicted that there will be no significant impact on highway usage (levels of saturation of new and existing roads and intersections). For more information on the Project's road operations, measurements used and models derived, see **Annexes 9 and 15 of the Addendum**.

Additionally, increases in noise emissions are analyzed in **Section 6.4.1.2 of the EIS**.

Notwithstanding the above, it is assumed that, given that certain construction activities shall be conducted at the same times that other road users wish to make use of certain sections of specific roads, a certain level of annoyance may be caused, and for this reason the PHAM has adopted a number of control and mitigation measures,

indicated in **Chapters 6 and 2 of the EIS** and in **Annex 14 of the EIS, as well as Annexes 9 and 17 of Addendum 1**.

It is considered likely that, in view of the predominance of the tourist industry in the local economy of the district of the Maipo Valley, a certain level of annoyance may be caused at certain points and at specific moments, mainly due to conflicts between PHAM road usage and the movements of visitors. As indicated in the EIS Baseline Study, this is an area where tourists come to enjoy walks and peace and quiet, on weekends and holidays. In particular, there are 2 specific tourism attractions located in the same areas as site installations: the El Yeso and the Alto Volcán area, where special measures shall be taken, as specified in **Chapter 6 of the Project EIS**.

Additionally, **Annex 32 of the EIS** specifies emergency procedures to be adopted in the event of transport accidents caused by project vehicles.

Remark N° 302
Cultural, Paleontological, and Natural Heritage - Baseline
A)

In point V.6 in the EIS, regarding cultural heritage, the existence of heritage resources within the Project's area of influence is recognized, stating that "three areas are identified as featuring resources of cultural interest: Las Morrenas and Camino del Inka in the Lo Encañado Lake area, and the site known as Aucayes I in the Colorado River - Aucayes Stream area (...). In the Alto Volcán area, sites have been detected that may contain very ancient fossils or paleontological material(.....). The PHAM works shall cause no direct intervention".

Further on in the document, in Table 7 (Identification, prediction, and evaluation of environmental impacts and risk situations) it is recognized that the Project shall have a LOW-SIGNIFICANCE NEGATIVE IMPACT on these resources. It should be pointed out that the impact on heritage resources is NEGATIVE AND IRREVERSIBLE (implying their destruction) and therefore cannot be considered to be of low significance.

Furthermore, in TABLE 6, it is stated the Project SHALL NOT AFFECT CULTURAL HERITAGE SITES IDENTIFIED IN THE BASELINE.

Please clarify the contradictions between information provided by the Project Owner in the baseline and in tables 6 and 7: Will the Project have an impact on the area's 3 sites of archeological and paleontological resources, or will it not?.

Thematic responses

**ARQ Archeological and
Paleontological Sites:
Heritage**

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

**ARQ.01
Regulations**

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum 1**.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material**

- b) **creation of a viewpoint**
- c) **Fossil trail**

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

ARQ.03 Scientific research

The scientific and cultural importance of the paleontological resources present has been recognized by the PHAM project principal, leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the project principal has taken on a commitment to enhance knowledge of the area before starting planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may be detected during the course of construction under the PHAM. These activities will contribute not only to the maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of materials or components present.

For more information, see **Annex 14 of Addendum 1**.

Remark N° 303
Cultural, Paleontological, and Natural
Heritage:
Baseline
B)

Please indicate why no information was provided on the Inca site at Laguna del Indio. This site is located mere meters from the Inca trail located 1.5 km from the Project, and consists of a collection of structures in a natural depression, immediately to the W of the Laguna del Indio (Yeso River). The site contains four main enclosures, separated by a central passageway, with each enclosure subdivided into smaller rooms. Several of these rooms show clear evidence of looting. (UTM 396,500 E 6,274,479 N) Elevation 2692 m. The site features a number of architectural features typical of Inka architecture (Late period, c. 1470 to 1535 CE). The site features typical construction techniques, with double walls filled in with small stones. The central passage features a precise E-W orientation, and the layout divides the site perfectly into four parts. The site is associated with the Inka Trail known as the Camino del Inka (see the publication Nuevos Registros de Asentamiento Inca en la cordillera andina de Chile Central. Luis E. Cornejo B., Miguel A. Saavedra V. and Héctor Vera C. 2006).

Please clarify why no reference is made to the existence of published sites located near to the Project.

Thematic responses

ARQ Archeological and
Paleontological Sites:
Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

ARQ.01
Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum 1**.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material
- b) creation of a viewpoint
- c) fossil trail

For more information and details on the preservation of heritage value and

paleontological resources, please see **Annex 14 of Addendum 1**.

ARQ.03 Scientific research

The scientific and cultural importance of the paleontological resources present has been recognized by the PHAM project principal, leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the project principal has taken on a commitment to enhance knowledge of the area before starting planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may be detected during the course of construction under the PHAM. These activities will contribute not only to the maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of materials or components present.

For more information, see **Annex 14 of Addendum 1**.

Remark N° 304
Cultural, Paleontological, and Natural Heritage
Chapter 8. Environmental Monitoring Plan

Chapter 8 contains the Environmental Monitoring Plan, which will allow the monitoring of relevant environmental variables that have given rise to the content of the EIS. Here, the Project Owner states that "The PHAM hereby submits to the SEIA that during execution of the Project certain effects, characteristics, or circumstances referred to in subsections b), d), e), and f) of Article 11 of Law 19,300 may arise or be caused, and that therefore the implementation of the Project shall include a suite of mitigation, compensation, or restoration measures that are suitable for offsetting these effects". Part f) of that Article refers to "alteration of monuments, sites with anthropological, archeological, or historic value, and, in general, sites belonging to cultural heritage", including areas of paleontological interest.

Although heritage is specifically recognized as a relevant environmental variable, it is recognized that it will be affected by a negative impact, and the presence of a suitable professional is proposed, in order to undertake continual monitoring during the construction phase; nonetheless, the EIS does not contain plans to integrate this action into the environmental monitoring plan.

Clarify these contradictions.

Thematic responses

ARQ Archeological and Paleontological Heritage Sites:

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

ARQ.01 Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
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- Workforce training on the possible presence of archeological sites.
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ARQ.02 Values preservation

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i) Restricted area applicable to contractor company employees

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ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material
- b) creation of a viewpoint
- c) fossil trail

For more information and details on the preservation of heritage value and

paleontological resources, please see **Annex 14 of Addendum 1**.

ARQ.03 Scientific research

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Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of materials or components present.

For more information, see **Annex 14 of Addendum 1**.

Remark N° 305
Cultural, Paleontological, and Natural
Heritage
Preventive Measures:

In order to protect heritage resources, the Project Owner plans to obtain "*continual on-site expert advisory services to prevent or minimize impact*" (table 7). At which work sites will archeological monitoring be implemented? This question should also be taken to include muck disposal sites, sites for the extraction of aggregates and sand, and works involving improving, widening, and maintaining roads.

Furthermore, we do not consider this measure to constitute a "risk and accident prevention measure", for the reasons expressed in the previous point.

Thematic responses

ARQ Archeological and
Paleontological Sites:
Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

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Regulations

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ARQ.02 Values preservation

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iv) Compensation measures

- a) production of cultural information material**
- b) creation of a viewpoint**
- c) fossil trail**

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

Remark N° 306
Cultural, Paleontological, and Natural
Heritage
Sites of Paleontological Interest

The Project Owner plans to conduct a complementary paleontological study in advance of construction, and to implement certain management measures to protect the resources currently registered with the SPACH, and other resources that may be discovered. In this regard, during the evaluation of the first EIS presented, which is currently under review, the CMN, which is the competent body in the field, has already issued a request for the preparation of a report that has yet to be produced.

When does the Project Owner plan to comply with this requirement? Specifically, what are the “management measures” that the Project Owner plans to implement to protect these resources?.

Thematic responses

ARQ Archeological and
Paleontological Sites:
Heritage

According to the results of archeological survey activities and background information compiled, the Project’s area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project’s area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

ARQ.01 Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum**.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a “restricted zone” with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project’s paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) production of cultural information material
- b) creation of a viewpoint
- c) fossil trail

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

ARQ.03 Scientific research

The scientific and cultural importance of the paleontological resources present has been recognized by the PHAM project principal, leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the project

principal has taken on a commitment to enhance knowledge of the area before starting

planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may be detected during the course of construction under the PHAM. These activities will contribute not only to the maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of materials or components present.

For more information, see **Annex 14** of **Addendum 1**.

Remark N° 307
Cultural, Paleontological, and Natural Heritage
Annex 43 Minutes of Meeting between SPACH and Gener

This annex contains the minutes of a meeting held on January 3, 2008, and it is therefore not appropriate to cite it in the Project assessment currently under review. Furthermore, it is there stated that the issue of paleontological heritage is outside of the remit of the PAC and ICSARA (we assume that this refers to the EIS that was withdrawn), and yet the Project Owner states that "AES Gener thanks the SPACH for highlighting the scientific and cultural value of these bodies of evidence, which it recognizes and respects, and although they do not fall within the established procedure it shall include them as part of the citizen participation process". As stated in point 4 of this document, the CMN (the applicable competent body) has yet to issue a statement on the significance of these paleontological resources, and requested the preparation of a report complying with the items specified in the corresponding ordinance. The Project Owner has yet to respond to this requirement. Additionally, the minutes contained in Annex 43 also set forth a series of items agreed with the SPACH, including: "Based on these concepts, within the next two days the SPACH shall prepare a methodological proposal to form an agreement with AES Gener regarding the scope, by means of a joint agreement that includes the commitments made in the agenda." If this proposal must be submitted by January 05, why was it not included in the study currently under review? The following item states that: "All necessary permits shall be submitted for procedures conducted by the SPACH, and this body shall be directly involved in the procedures to be implemented." In this regard, the Project Owner is requested to indicate the name of the qualified paleontologist who shall be responsible for obtaining these permits.

The Project Owner is hereby informed that the permits granted by the CMN for intervention in this type of resource are personal and non-transferable in nature, and therefore cannot be requested by the SPACH. Requests made to the CMN must specify a number of points, including the professional responsible for the activity, work team, specialists who are to analyze materials, and methodology for excavation or recovery of finds, and analysis (see the regulations on Law 17,288, on persons authorized to conduct surveys and request permits to excavate and intervene affecting such resources). Finally, the Project Owner is hereby informed that excavation permits constitute a sector environmental permit, and as this permit is necessary, it should already be requested under the study presented in the plan for compliance with environmental legislation in force (Point 2 of the executive summary)

Thematic responses

ARQ Archeological and Paleontological Sites: Heritage

According to the results of archeological survey activities and background information compiled, the Project's area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project's area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

ARQ.01 Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
- Expert supervision by an on-site archeologist present at the Project construction site at all times. Additional periodic oversight by a paleontologist during the construction of the first part of the Volcán Tunnel.
- Archeological recovery plan for any finds discovered during expert supervision.
- Workforce training on the possible presence of archeological sites.
- Details of these risk prevention measures applicable to archeological and paleontological heritage are provided in **Chapter 7 of the EIS**, and **Annex 14 of the Addendum**.

1.

ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a "restricted zone" with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

ii) Delimitation of buffer zones

Before the start of construction activities, a team of professional paleontologists will conduct an inspection visit and will delimit the areas that are of paleontological interest (e.g. concentrations of Río Damas Formation blocks, which contain possible traces of prehistoric vertebrates). A buffer zone will be laid out around each such area, installing

signage centered on the prohibition of access, as a means of preventing accidental damage to items of interest by contractor company personnel or private individuals passing through the area. This measure implies a commitment by the contractors to enforce compliance with the access

restriction.

The Project Owner shall take the decision to fence off areas of paleontological or archeological interest as required, avoiding negative impacts.

iii) Contingency measures

In the event that fossil materials are found in other areas, the National Monuments Council will be notified, and the team of paleontologists engaged in the Project's paleontological monitoring shall assess procedures that must be undertaken, in accordance with the stipulations of Law 17,288 and accompanying regulations.

iv) Compensation measures

- a) **production of cultural information material**
- b) **creation of a viewpoint**
- c) **fossil trail**

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

Remark N° 308
Cultural, Paleontological, and Natural
Heritage
El Morado Natural Monument

CONAF, in Ordinance 30 dated February 5, 2008, and Ordinance 70 dated April 9, 2008, requested that the line taken by the tunnel be adjusted so as not to enter this protected area, as it considered that the Project Owner had been unable to guarantee that the construction and operation of the El Volcán Tunnel would not lead to impacts on the resources and processes that the area protects - in particular, geological and geomorphological processes and features, including the glacier and fossil-bearing strata; rather, the Project Owner was only able to express that the occurrence of problems or contingencies was of low likelihood.

This monument was created with the purpose of *“Preserving an ecosystem that is representative of the upper Maipo River basin (Morales Stream) by protecting its natural scenic beauty, its geological and geomorphological processes, and its living organisms facing conservation challenges”* (...) *“The area’s specific conservation objectives include the preservation of the geological and geomorphological processes and features present in the Area, including the glacier and fossil-bearing strata; protection of the Area’s natural scenic beauty, including its glacier, vegetation, lake, streams, mineral waters, and fossil-bearing rock strata, and support of scientific research into its natural and cultural resources, permitting the enhancement of knowledge regarding the area”* (CONAF).

Clarify these contradictions, and explain why the modification requested have not been implemented.

Thematic responses

ARQ Archeological and
Paleontological Sites:
Heritage

According to the results of archeological survey activities and background information compiled, the Project’s area of influence features two more sensitive areas, which contain resources of cultural interest. These sites are located in the Project’s area of **indirect influence**; they are locations where no PHAM construction is scheduled to take place. These sites are:

- Lo Encañado Lake area, where two sites of archeological interest have been recorded (Las Morrenas and Camino del Inka)
- Colorado River – Aucayes Stream area, where the site known as Aucayes 1 was recorded.

For more information, see **Annex 9 of the EIS**. Meanwhile, information on paleontological finds is included in **Annex 14 of the Addendum**.

ARQ.01
Regulations

The Project shall not affect the sites identified in the Baseline studies (**see Chapter 5 of the EIS**). Nonetheless, as a protection measures GENER shall contractually require that the works contractor implement the following measures:

- Construction of a fence running around the site in question, with at least 5 m between the perimeter of the site and the fence.
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ARQ.02 Values preservation

General paleontological protection measures:

i) Restricted area applicable to contractor company employees

This restriction will apply to the area adjacent to the Alto Volcán sector, where PHAM construction is to take place, known as the Valle de las Arenas. The Project Owner will declare this area a “restricted zone” with regard to the contractors (see the map included in Annex 14 of the Addendum); contractor personnel will have their access restricted, and permanent or temporary construction activities will be prohibited (section 6.3.3 of the EIS). This area will be marked out with clear signage, applicable to all Contractor personnel during the construction phase.

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iv) Compe neasures

- a) a)production of cultural information material**

- b) creation of a viewpoint
- c) fossil trail

For more information and details on the preservation of heritage value and paleontological resources, please see **Annex 14 of Addendum 1**.

ARQ.03 Scientific research

The scientific and cultural importance of the paleontological resources present has been recognized by the PHAM project principal, leading to a practice of taking particular care in selecting locations of works sites and installations in the Alto Volcán area, so as to protect and prevent the deterioration of all recorded or known resources. At the same time, the project principal has taken on a commitment to enhance knowledge of the area before starting planned works, undertaking survey studies of the Alto Volcán area, in parallel with suitable protection for sites recorded in that zone, as well as any new finds that may be detected during the course of construction under the PHAM. These activities will contribute not only to the maintenance of the aforementioned resources, but shall also add to the recognition of the sites where they are found.

Thus, in the framework of procedures for the approval of the EIS, all available information on the most significant earth science materials and components has been compiled, as applicable to the PHAM area and surroundings, forming part of the country's non-renewable scientific/cultural heritage. Additionally, the documentation addresses preventive and contingency measures to be implemented in order to minimize the possible effects of this project, particularly where justified by the heritage significance of materials or components present.

For more information, see **Annex 14 of Addendum 1**.

Remark N° 309
Cultural, Paleontological, and Natural
Heritage
Protected areas: La Engorda
Meadow

The EIS contains plans to alter these meadows/wetlands through installing pipelines running underneath them, construction of inlets, and construction of certain access routes and the El Morado siphon. In this regard, it can be stated that - as is suggested by its name - this meadow and the vegetation that surrounds it represent a unique ecosystem, which is of particular importance due to its use fattening up livestock. Nonetheless, the Project does not feature suitable mitigation and compensation measures.

The Project Owner should include the mitigation and compensation measures that it therefore plans to implement.

Thematic responses

F&F Biodiversity Impact

Flora and
Fauna

The study conducted found evidence of the presence of 258 species of plants in the PHAM area of influence. Approximately 86 species of animal were recorded, including 3 species of amphibians, 9 reptiles,

70 bird species, and 4 mammals. These species counts are a sum total for the diversity of environments included in the study, and it must be taken into account that the areas subject to intervention are relatively small, and a large proportion of the total area is located in dry, high altitude habitat zones. A low level of aquatic fauna species richness and abundance was found, with a predominance of the introduced species *Salmo trutta* (Brown Trout) (**EIS, Chapter 5.4.3.3**).

F&F.02 Identification of
species affected

Aquatic flora and
fauna

3 fish species were recorded in the study area: *Salmo trutta* (brown trout), *Oncorhynchus mykiss* (rainbow trout) and *Trichomycterus areolatus* (Chilean Pencil Catfish or Bagre). The Bagre is a protected native species, and was recorded in the Maipo and Colorado Rivers (**EIS/5.4.3, and Addendum 1, Annex 17**). With regard to amphibian species facing conservation concerns, the presence of the following species has been recorded: the black spiny chest frog *Alsodes nodosus*, in the Aucayes Stream; the spiny frog in the El Volcán and Lo Encañado areas; and the four-eyed frog in the Colorado River area, the Quempo Stream, and the Lo Encañado Lake. These species inhabit a habitat comprising wet or moist areas, such as river bank areas and small pools.

A detailed analysis and identification of the aquatic plant species recorded in the Project's area of installation is to be found in the EIS, Chapter 5.4.3; this section also includes the results of sampling activities conducted.

For complementary and more in-depth information, see **Annex 17 of the Addendum**.

Terrestrial flora and
vegetation

The following endangered species have been found to exist within the Project's area of influence: *Kageneckia angustifolia*; *Puya Berteroniana*; *Neoporteria curvispina*; *Laretia acaulis*; *Porlieria chilensis*; *Alstroemeria exerens*; and *Cryptocaria alba* (**EIS, Chapter 5.4**)

The Project calls for the replacement of woodland vegetation through the reforestation of land areas that are preferentially suitable for woodland coverage. The species listed for conservation that are not included in the woodland management plan are covered in the revegetation plans, which propose the replacement of 10 individuals for every one individual affected (**EIS, Chapter 7, Annex 7, and Annex 29**).

Terrestrial
fauna

The following list presents the key species that have been recorded in the PHAM area and that face conservation concerns: Black Spiny Chest Frog (*Alsodes nodosus*), Four-eyed frog (*Pleurodema thaul*), Spiny Frog (*Bufo spinulosus*), Lo Valdés Lizard (*Liolaemus moradoensis*), Green Black Iguana (*Lilolaemus nigroviridis*), Racerunner or Chilean Iguana (*Callopistes palluma*), and Cururo (*Spalacopues cyanus*). For additional, complementary information, see **Addendum, Annex 4**.

F&F.02.01 Impact

Aquatic flora and
fauna

During the construction phase, the impact of the Project on aquatic organisms shall be related specifically to the construction of intakes, siphons, bridges, and river protection measures, and online inasmuch as such works lead to the modification of the watercourse and affect water quality; in general, these events shall be temporary in nature, and of low magnitude.

In general, surface watercourses located within the Project area currently exhibit a significant level of human intervention, and as a result, populations of organisms consist mainly of introduced species (EIS 5.4.3). For more information, see Annex 17 of the Addendum.

The PHAM is expected to have no significant impact on this environmental system, as construction activities and subsequent power plant operations shall not affect the continuity of water flow, and shall not cause significant effects on the habitat conditions of benthic

communities, which shall maintain the same levels of abundance and species richness that they currently exhibit (EIS, Chapter 6).

Terrestrial Flora and Vegetation

Impact on terrestrial plant life will consist of the removal of individual plants and/or trees at the sites where works and installations are to be located. Given that most of the works constructed will be underground, and furthermore that the design of surface works has been conducted taking into account environmental criteria for siting, the removal of woodland and/or plant specimens of species listed for conservation will be minor (see EIS, Annexes 7 and 29).

Planned environmental management measures to mitigate/compensate for vegetation subject to intervention are presented in the woodland management plan and vegetation restoration plan (see EIS, Annexes 7 and 29).

Terrestrial fauna and birds

The impact on the terrestrial wildlife and birds shall consist of moving or displacing local animals - mainly reptiles and amphibians - due to the modification of their natural habitat and/or their being scared off by human activity. Over the course of the project, certain individuals may be lost, either those belonging to low-mobility species or those that lose their burrows or nesting sites. Nonetheless, based on past experience in similar projects, it is believed that most animals will tend to move away from areas subject to intervention as a result of Project works construction, moving into neighboring areas (EIS, Section 6.4.1.6).

No effects on birds are foreseen, beyond those indicated in the previous paragraph (EIS 5.4.2).

For more in-depth information on the wildlife management plan proposed by the Project Owner, see Annex 4 of the Addendum.

F&F.02.02 Mitigation

Aquatic flora and fauna

The Project calls for a suite of multi-purpose environmental management measures that aim to minimize its effects on living organisms, including: minimization of watercourse areas to be subject to intervention by prioritizing such works for late summer and early fall seasons (period of lowest flow rates), the adoption of special precautions to prevent accidental spillages into watercourses (prohibition of the storage of lubricant drums in or near watercourses, etc), and permanent maintenance of ecological flow rates.

For more detailed information, including technical documentation that complements the information described above, see Annex 17 of the Addendum.

Terrestrial Flora and Vegetation

In order to prevent and/or minimize the Project's effects on plant life, it plans to adopt a number of integrative measures: micro-routing in advance of starting work on-site, in order to identify specimens of plants listed in any conservation category and subject to impact; compensation with the planting of 10 specimens for every one destroyed, in the case of non-woodland species listed for conservation; implementation of a woodland management plan applicable to woodland areas, which describes its measures in accordance with Article 5 of the Woodland Law; implementation of vegetation restoration plans at muck disposal sites, encampments, artificial slopes, and tunnel access terraces (EIS, Annexes 7 and 29). More in-depth information on complementary measures is provided in Annex 6 of Addendum 1.

Terrestrial fauna

Specific wildlife environmental management measures have been proposed for each particular species, taking into account prior experience in the success of these measures in similar projects. These measures will be implemented in continual coordination with the Servicio Agrícola y Ganadero. Principal measures include: capture of individuals belonging to species of conservation interest for rescue and relocation; controlled perturbation actions; and habitat replacement. Other measures are based on the use of signage, training for Contractors, and contractual requirements for on-site supervision (see details in Section 6.4.1.6 of the EIS).

See Annex 4 of the Addendum for the native wildlife rescue and relocation plan.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as

making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

SUE Soil Impact

The baseline studies used in determining the soil characteristics of the Project area are presented in **Section 5.3.4 of the EIS**. Complementary information is provided in **response 32 xiii in Section 5 of Addendum 1**. In general, the District of San José de Maipo features low soil quality, as a result of its topographic and geomorphological characteristics. According to a study conducted by the Instituto de Investigaciones de Recursos Naturales (IREN) (Pérez, W.; Tamayo, A.: 1996), most soils in the District are classified as dryland non-arable soils.

In the land areas that form the Project's area of influence, and in particular in the upper reaches of the Yeso River and Volcán River sub-basins and in the middle reaches of the Colorado River, current usage patterns are strongly influenced by relief characteristics and conditions, and prevailing high mountain climate conditions, which bring about a number of limiting factors - including physical factors and accessibility factors - affecting the development of human activities.

SUE.01 Regulations

The Project Owner is subject to the following regulations, which are specified in detail in Chapter 5 of the EIS, Section 5.7.2.1, regarding the Santiago Metropolitan Master Plan.

With regard to planning instruments, the PHAM is to be implemented in the district of San José de Maipo, which does not have a District Master Plan (one is currently being prepared), and which only has current urban limits for the settlements of San Alfonso, La Obra, San José de Maipo, El Melocotón, San Gabriel, and Las Vertientes. Conversely, the Santiago Metropolitan Master Plan (PRMS) establishes a number of land use regulations that apply to the project area, most of which are related to ecological preservation and/or protection and risks. Most of the district's surface area is classed as Ecological Preservation Area, which aims to maintain a zone's natural state, in order to preserve and contribute to the environment's quality and equilibrium, as well as to preserve landscape heritage (see further information in the conclusions stemming from analysis of regulations, in Section 5.7.3, Chapter 5 of the EIS).

Supreme Decree 366 (Exploitation of Tamarugo, Carob, Chañar, Guayacán, Aextoxicon, Charcoal, Acacia, Boldo, Maiten, Litre, Bollen, and Quillay). This legal instrument governs the felling of trees and bushes.

Supreme Decree 4363 and D.L 701 (Approving the Definitive Text of the Law on Woodland and Regulations on Forest Promotion).

Article 2 of the Woodland Law establishes an obligation that land classified as for preferential woodland land use, as well as natural and artificial woodlands, are subject to woodland management plans approved by the National Forestry Commission (CONAF). Furthermore, Article 21 of Decree Law 701 establishes that any felling or usage of native woodland shall be subject to the CONAF's prior approval of the corresponding management plan.

Decree 82 (Prohibiting the Felling of Trees and Bushes in Indicated Andean High Mountain and Foothill Areas)

Article 102 Sector Environmental Permit (Permit for the felling or exploitation of native woodland, in any type of land, or plantations located in land with preferential characteristics for woodland use).

For further information and analysis on the aforementioned regulations and permits, as applicable to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see Sections 3.2.6 and 3.3.7 in Chapter 3 of the EIS.

SUE.02 Soils, meadows, and wetlands

The Project Owner has conducted a number of studies with the aim of characterizing the vegetation of summer grazing areas (La Engorda) (see details in Addendum 1, Annex 6, and in Chapter 5 of the EIS), as well as flora and vegetation studies in the Project's area of influence (EIS, Chapter 5).

These studies contain information compiled in fieldwork campaigns conducted in Fall 2005, Spring 2006, November 2007, March 15 and 16, 2008, and September 2008, which add to the body of knowledge available regarding vegetation in these areas.

The Lo Encañado area shall be assigned a status of controlled access area for works contractors at all times: it shall not be subject to any intervention whatsoever. For more information on vegetation areas that could be affected by the construction works, and to learn about mitigation measures proposed by the Project Owner, you are advised to review Annex 42 of the EIS and Annex 6 of the Addendum.

With regard to environmental regulations that apply specifically to vegetation and plant life, the Project Owner shall be subject to:

Supreme Decree 366 (Exploitation of Tamarugo, Carob, Chañar, Guayacán, Aextoxicon, Charcoal, Acacia, Boldo, Maiten, Litre, Bollen, and Quillay). This legal instrument governs the felling of trees and bushes.

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For further information and analysis on the aforementioned regulations and permits, as applicable to the Project, as well as in terms of general aspects, compliance, and regulatory bodies, please see Sections 3.2.6 and 3.3.7 in Chapter 3 of the EIS.

Remark N° 312 Upper Maipo Basin Area Usage Flow Rate

The project plans establish a total water abstraction rate in the Upper Maipo Basin area of 27 m³/s. It is not made clear from where this flow rate will be abstracted, given that the maximum statistical monthly average for flow rate in the Yeso River is approximately 11 m³/s. The question is: what sites will be affected by the project - perhaps the El Yeso Reservoir - to achieve this flow rate?

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies

in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Qe zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as

well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 313 Mitigation, Restoration, and Compensation Measures

What concrete social benefits will AES Gener contribute to the local community, given that it shall make commercial use of the valley's water and landscape resources, which belong to all Chileans, and not to foreign companies like AES Gener? Indicate direct benefits in the fields of health, education, housing, etc. To benefit the citizens not only of Santiago but also of the local area.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

CAL.02 Education

A goal of the Maitenes Foundation relates to education for children and young people against the backdrop of the natural environment (for more information on the goals and achievements of the Foundation, see Annex 26 of the EIS).

Gener firmly believes that contributions to the technical and vocational education and training of young people must keep sight of real employment possibilities. Therefore, as a first initiative it has earmarked resources for an education improvement project in the district, which will contribute to establishing education management for the restructuring of the school curriculum and professional technical capacity building, taking into account the features needed to boost local employability. Based on information and recommendations from this study, Gener, acting through the Maitenes Foundation, will undertake a Capacity Building for Employability Program fundamentally oriented towards those whose family, social, or economic situation has barred them from completing their education and training, or acquiring the skills needed in order to find work.

CAL.03 Sports and leisure areas

In order to avoid the loss or modification of land usage patterns, changes in usage, or loss of income associated with potential reduction in perceptions of the value of the surrounding areas, in terms of the provision of leisure, tourism, education, and other related services, the Project has developed a suite of measures that aim to minimize its environmental impact, so as to preserve the features that lead to the high perception of value of the area among residents, visitors, and tourists. These measures include: installation of most works in underground settings, thus minimizing their visual impact; the preservation of ecological flow rates in rivers and streams; and revegetation and reforestation of affected areas.

Similarly, the Project has enacted a suite of further measures to minimize interference with traditional livestock industries, as well as tourism and mountain/river sports.

In this way, the Project has taken all steps necessary in order to mitigate impacts on the environment, which will allow the area to retain the characteristics that make it so attractive for open-air education, tourism, and leisure activities. This will allow the project to operate alongside existing activities conducted in this area.

A wide-ranging suite of monitoring activities will be implemented to verify the effectiveness of the environmental measures (for more information, see **Chapter 8 of the EIS**). In parallel, and in order to verify that the Project does not affect cultural land usage patterns, applicable indices will be included for monitoring under the Social Indicator Monitoring (SIM) program.

TUR Tourism Scenery

The PHAM shall not directly or indirectly affect the course of tourism activities in the district; that is, it shall not stand in the way of such activities taking place in the manner in which they are currently conducted, or developing according to prevailing trends. The only possible effect lies in a modification in level of natural characteristics belonging to the areas immediately adjacent to the sites of surface works, in those cases where these sites are located in areas that receive visitors. These effects shall not interfere in any way with activities conducted in the area, corresponding mainly to hiking, climbing, and mountaineering. The scope of this situation shall be extremely limited, being restricted to high and moderate elevation mountain areas. This situation applies to the works located in the lower parts of the Valle del Arenas or Valley of the Sands area, in Alto Volcán.

For additional, more specific information, see **Chapter 6.4 of the EIS, Addendum 1, Section V, Question 21** and **Section VII, Question 19**.

Remark N° 315 Upper Maipo Basin Area Usage Flow Rate

The Project plans establish a total water abstraction rate in the Upper Maipo Basin area of 27 m³/s. It is not made clear from where this flow rate will be abstracted, given that the maximum statistical monthly average for flow rate in the Yeso River is approximately 11 m³/s. The question is: does the project plan interventions affecting the El Yeso Reservoir?.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.05 Drinking water supply

Construction works and/or activities involved in the project (roads, movement of materials, transport of different products, etc) shall have no effect or impact whatsoever on the quality or security/safety of water supply in the Maipo River system. During the construction phase, Project interventions affecting watercourses shall cause only temporary effects resulting from Earth moving during excavation and other construction activities. This intervention shall affect small areas over short time periods, as it shall last only during the period while these installations are under construction (see **Section 6.4.1.4 of the EIS and Section VII, Question 17, in the Addendum**).

During operations, the PHAM shall not affect the Laguna Negra-Lo Encañado and El Yeso

Reservoir system, which is managed by the company Aguas Andinas S.A, in its capacity as holder of the drinking water concession for Santiago; nor shall the Project affect the operational dynamics of the drinking water supply system. Therefore, the implementation of the PHAM does not imply any impact whatsoever on the supply of drinking water (see **Section I, responses 27 and 29, in the Addendum**).

Furthermore, the water abstracted by the Project shall be returned to the river 5 km upstream of the

Toma Independiente or Independent Intake, operated by the company Aguas Andinas S.A., which abstracts water for drinking water supply to the city of Santiago; therefore, the PHAM shall not affect normal operations of this system. The PHAM shall only affect the delivery point of water in the tributaries of the Maipo River; in other words, water that currently does not drain into the Maipo River shall not be incorporated into that river's total flow.

However, in the event that an incident may arise as a result of an accident during construction, such as accidental spillages or rock falls, the procedures described in the Contingency Plan shall be implemented, consisting of a suite of actions to solve associated problems. This plan is explained in detail in **Chapter 7 of the EIS, Section 7.2.5**.

**AGU.05.01 Drinking water
quality**

The process of hydroelectric power generation does not affect the physical/chemical qualities of water. Additionally, the PHAM does not plan to implement regulation installations that retain sediment. Thirdly, downstream of the discharge point the natural river conditions are maintained with regard to flow rate and physical/chemical properties.

During the construction of installations to be located in watercourses, the free-flowing course of the river is maintained through the construction of diversions through pipes laid along the river course for such purposes, or through channels that divert all flow, allowing free water circulation with no effect whatsoever on quality (see **Section I, Question 28, in the Addendum**).

The Project owner shall not make use of the Lo Encañado Lake or water usage rights owned by Aguas Andinas S.A. for this Project, instead opting to forgo usage of these resources and to replace the role that would have been fulfilled by the Lo Encañado Lake with a forebay located on a widening of the Alfalfa II plant headworks, located in the Alto Aucayes area on the Colorado River Valley (for details, see **EIS 2.2.1**). The Lo Encañado area shall be assigned a status of controlled access area at all times: it shall not be subject to any intervention whatsoever.

The Project Owner has made available a Water Quality Monitoring Program, with specifications for application during both the construction and operations phases. This program espouses a commitment to verify the effectiveness of environmental control measures designed to minimize the effects of works construction activities during the construction phase.

For further information on the Monitoring Program, see **Sections 8.2 and 8.3** in **Chapter 8 of the EIS**.

Remark N° 318 Drinking Water

Ideally this should be extracted from a borehole into the distribution tank, to prevent it from being contaminated by snow melt or rain.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.05 Drinking water supply

Construction works and/or activities involved in the project (roads, movement of materials, transport of different products, etc) shall have no effect or impact whatsoever on the quality or security/safety of water supply in the Maipo River system. During the construction phase, Project interventions affecting watercourses shall cause only temporary effects resulting from Earth moving during excavation and other construction activities. This intervention shall affect small areas over short time periods, as it shall last only during the period while these installations are under construction (see **Section 6.4.1.4 of the EIS and Section VII, Question 17, in the Addendum**).

During operations, the PHAM shall not affect the Laguna Negra-Lo Encañado and El Yeso Reservoir system, which is managed by the company Aguas Andinas S.A, in its capacity as holder of the drinking water concession for Santiago; nor shall the Project affect the operational dynamics of the drinking water supply system. Therefore, the implementation of the PHAM does not imply any impact whatsoever on the supply of drinking water (see **Section I, responses 27 and 29, in the Addendum**).

Furthermore, the water abstracted by the Project shall be returned to the river 5 km upstream of the Toma Independiente or Independent Intake, operated by the company Aguas Andinas S.A., which abstracts water for drinking water supply to the city of Santiago; therefore, the PHAM shall not affect normal operations of this system. The PHAM shall only affect the delivery point of water in the tributaries of the Maipo River; in other words, water that currently does not drain into the Maipo River shall not be incorporated into that river's total flow.

However, in the event that an incident may arise as a result of an accident during construction, such as accidental spillages or rock falls, the procedures described in the Contingency Plan shall be implemented, consisting of a suite of actions to solve associated problems. This plan is explained in detail in **Chapter 7 of the EIS, Section 7.2.5**.

AGU.05.01 Drinking water quality

The process of hydroelectric power generation does not affect the physical/chemical qualities of water. Additionally, the PHAM does not plan to implement regulation installations that retain sediment. Thirdly, downstream of the discharge point the natural river conditions are maintained with regard to flow rate and physical/chemical properties.

During the construction of installations to be located in watercourses, the free-flowing course of the river is maintained through the construction of diversions through pipes laid along the river course for such purposes, or through channels that divert all flow, allowing free water circulation with no effect whatsoever on quality (see **Section I, Question 28, in the Addendum**).

The Project owner shall not make use of the Lo Encañado Lake or water usage rights owned by Aguas Andinas S.A. for this Project, instead opting to forgo usage of these resources and to replace the role that would have been fulfilled by the Lo Encañado Lake with a forebay located on a widening of the Alfalfa II plant headworks, located in the Alto Aucayes area on the Colorado River Valley (for details, see **EIS 2.2.1**). The Lo Encañado area shall be assigned a status of controlled access area at all times: it shall not be subject to any intervention whatsoever.

The Project Owner has made available a Water Quality Monitoring Program, with specifications for application during both the construction and operations phases. This program espouses a commitment to verify the effectiveness of environmental control measures designed to minimize the effects of works construction activities during the construction phase.

For further information on the Monitoring Program, see **Sections 8.2 and 8.3 in Chapter 8 of the EIS**.

Remark N° 319 Drinking Water and Roads

This project should use tunnel openings to aim to deposit muck in safe areas (geologically stable) where sediments and acids from the reaction of muck with rainwater do not run off into natural watercourses.

Earth moved for road construction should not be discarded as offspill down hillsides, but should rather be transported to landfills of muck disposal heaps, so as to avoid excessive habitat destruction.

Thematic responses

MAR Muck

The PHAM plans to construct approximately 70 km of tunnels. The excavation of these tunnels will generate inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of inert material produced in road building and the construction of buried conduits.

This muck material will be deposited in the 14 muck disposal heaps that the Project plans to create. For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria. For more information, please see **Annex 6 of the EIS** and **Annex 3 of the Addendum**.

MAR.01 Regulations

The Project Owner has made available a Management Plan for "Project Muck Disposal Heaps", which contains information on the technical, environmental, and safety specifications of the heaps, as well as recommendations contained in the Ministry of Public Works' 2004 Environmental Management Plan Manual for Works Subject to Concessions. In particular, the Plan establishes the environmental considerations adopted for the operation of the muck disposal heaps, to be implemented during the construction of tunnels and roads under the PHAM.

In order to comply with the environmental management measures contained in the EIS, an Environmental Monitoring Program will be conducted, with the aim of verifying the effectiveness of these measures and compliance with them. For details on the principal actions included in the Monitoring Program, and for the various stages of functionality of the muck disposal sites, see **Annex 6 of the EIS** and **Annex 3 of Addendum 1**.

For more information on the specific regulations applicable to the Project, and compliance therewith, see **Chapter 3 of the EIS**.

MAR.02 Location

The PHAM calls for the creation of 14 muck disposal heaps, for the disposal of waste material from tunnel boring and smaller quantities of inert waste from the construction of roads and buried conduits. Maps of the muck disposal heaps, and a copy of the muck disposal heap management plan, are included in Annex 6 of the Project EIS.

For the purposes of muck disposal heap site selection, design, and management procedures, attention has been paid to technical, environmental, and safety criteria.

From a technical and safety perspective, the muck disposal heap sites have been located as close as possible to exit points from tunnels and to surface work sites, in areas not at risk to landslides or landslip events.

The following aspects have been taken into account as environmental criteria in site selection:

Sites have been selected that are distant from any settlements or any housing used on a permanent or temporary basis.

Priority has been given to selecting sites with low visual impact - that is, in areas that are distant from potential observation points on public highways or high ground.

In the Project area's higher elevation regions, the disposal heaps have been sited up against natural topological features, such that the emplacement of the heaps' layers forms a continuation of the general landform structures of the area.

In general these are areas that are of low value as a habitat for plant life (soils with usage capacity ratings V, VI, and VII), and efforts have been made to avoid modifications to the original land form structures present or to surface watercourses.

Surface surveys have been conducted in all of these regions, as details in **Section 5.8, in Chapter 5 of the EIS**, to rule out the presence of sites of archeological and/or paleontological value at the muck disposal heap sites.

For more information, see **Annex 6 of the EIS** and **Annex 3 of Addendum 1**.

MAR.03 Characteristics

The material to be deposited in the muck disposal heaps will be inert material consisting of wet rock and crushed rock, known as muck, as well as smaller quantities of waste material produced in road building and the construction of buried conduits. It is expected that a total of 1.7 m cubic meters of TBM muck will be produced.

The total volume of material to be disposed of is estimated at 2.7 m cubic meters, including uncompacted rock and soil; this material will be disposed of at the 14 muck disposal heap sites

planned under the PHAM. Maps of the muck disposal heaps, and a copy of the muck disposal heap management plan, are included in Annex 6 of the EIS.

The waste material produced through tunnel excavation, road building, and construction of buried conduits during the construction phase will be deposited in a series of layers forming terraces. The muck disposal heaps will be built up in an organized manner, forming level and safe platforms, with slopes at the sides with the natural gradient formed by the material in question, thus ensuring stability and permitting adequate drainage. All of these design features are in conformity with the muck disposal heap construction method and environmental measures indicated in **Section 4.2 of Annex 6 of the EIS, and Annex 3 of Addendum 1**.

Finally, the filling will be covered with 20 cm of organic soil, permitting the definitive finishing of the spoil heap.

Management and restoration techniques for the 14 muck disposal heaps are indicated in Annex 29, "Restoration Plan", which includes information on surface treatments.

MAR.04 Impact

All of the measures adopted for the creation, operation, and abandonment of the muck disposal heaps will be implemented by the Works Contractor. Gener will undertake an environmental monitoring plan addressing the management and usage of the sites, which will include site inspections and periodic review of site entry records.

Rainwater will be managed using specially designed channeling works, the details of each of which are indicated in the plans attached in Annex 6 of the EIS.

The Project Owner's reiterates its commitment to undertake an exhaustive program to rescue low mobility fauna in the area of direct influence of PHAM works (including the area to be occupied by the 14 sites where muck, spoil, and earth will be disposed of in heaps). This wildlife rescue will require the application of capture techniques suitable for small mammals, reptiles, and amphibians. **Annex 4 of Addendum 1** presents the Wildlife Rescue and Relocation Plan.

Even following surveys ruling out the presence of archeological or paleontological sites or finds in the muck disposal heap sites, the PHAM also includes a series of measures designed to prevent any intervention in sites with heritage value, with the implementation of restricted areas and training programs for contractor personnel. For more information, see **Annex 14 of Addendum 1 and Annex 33 of the EIS**, "Restricted areas".

MAR.05 Composition and Hazardousness

Although the waste material produced from tunneling activities will be inert - in the construction of tunnels for the Alfalfal Plant, where 35 km of tunnels were excavated, no evidence was found of material that could lead to acidic or basic drainage in contact with rainwater - the PHAM includes a management plan applicable to water that may be produced from contact between muck or waste rock and rainwater or snow. For further details, see Annex 6 of the EIS.

The Project Owner plans to take measurements to assess the possibility of acidic drainage at the muck disposal heap sites, as indicated in **Annex 6, Section 5 in the EIS** and **Response 10 in Section 9 of Addendum 1**. The actions will form part of the Environmental Monitoring Plan, and will be preventive rather than response actions.

Remark N° 320 The Living Valley

In truth, rather than questions that have no answers, my remark is a call to action, as there is no way back from the destruction of nature, because the condors that abandon their nests on rocky crags because of the explosions, the fox chased by hostile humans invading its territory **will not return** and all the energy in the world will not pay for these losses, because I will no longer have anything fitting to point out to my grandson in the sky, it will no longer be worth waiting for the clouds around the mountaintops to clear after the rain to gaze upon these marvels, which they say **are protected, but now they will not be.**

Let us care for the little of the natural world that remains for us, let us protect the environment because if not, it will die.

To come back down to earth, I ask you: will there be any responsible body to oversee respect for the earth, the water, and the life of the Cajón del Maipo, if this project - which features so many anomalies in its presentation, and that also lacks the water needed to make a hydroelectric plant work - goes ahead?

Who will be the members of this body to oversee the contractors, their employees, and the project's works, if the project is approved? Who in our community will be a part of that? And who will cover the costs for these advisory services, and issue the reports on such monitoring?

Thematic responses

OTR Other

This section relates to certain special situations that could not be categorized, or that are linked to specific requests, disqualifications, or situations that feature a clear political component, against either the environmental authority or the Project Owner.

OTR.02 CONAMA

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic. The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly

frequented, minimizing their visual impact.

PRO.01 Regulations

A plan has been prepared addressing compliance with environmental regulation legislation applicable to the Project, as stipulated and specified in Article 12 part g) of Law 19,300, and Article 12 part d) of Ministry of the General Secretariat of the Presidency of the Republic Supreme Decree 95.01, which sets the recast text of the Regulations on the Environmental Impact Evaluation System (RSEIA), indicating the general and specific regulations directly associated with protecting the environment, preserving nature, the usage and management of natural resources, and the sector environmental permits that the Project will require for its execution (EIS, Chapter 3, Section 3.1)

Chapter 3 of the EIS provides detailed information on:

- The legal framework within which the Project was designed;
- The oversight bodies tasked with enforcing compliance in matters subject to regulation;
- The ways in which the Project will ensure compliance with these regulations.

The Project Owner is obligated to comply strictly with legislation in force, and the bodies tasked with enforcing this compliance are the governmental and state bodies specified in the same legislation.

Remark N° 321 Las Lajas Forebay

Maximum security fence to avoid all types of accidents.

Thematic responses

RSG Risk

The Project Owner possesses a general risk prevention strategy that imposes certain measures on the Project during its different stages of advance. This strategy features the following components:

- a) Measures incorporated into the Project's engineering design.
- b) Systematic verification of compliance with applicable regulations
- c) Establishment of restricted areas
 - c.1) Area restricted due to their archeological, paleontological, or heritage value
 - c.2) Area of natural value that requires protection by the Project
 - c.3) Officially protected area.
- d) Expert supervision during construction
- e) Training regarding environmentally sensitive issues
- f) Internal risk management and accident prevention programs
- g) Separation of works installations and encampments

For further information on each of these points, please see **Chapter 7 of the EIS**, which specifies the **Environmental Management Plan**, the **Risk Control and Prevention Plan** designed for the Project, the safety measures to be adopted in light of the risks identified, and, finally, the **Accident control plan**, to be activated in the event of the failure of the preventive measures taken by the Project Owner. Furthermore, **Annex 32 of the EIS** presents the **Risk and Contingency Prevention Plan** for contractors.

RSG.01 Load rejection

During the operation of the power plants, situations may arise that necessitate the stoppage of one or both plants for a certain period of time. Two temporary phenomena occur at such times, the effects of which must be analyzed. These phenomena are mass oscillations within tunnels carrying water under pressure, and impact on the Maipo River system's flow dynamics.

A special situation arises in the operation of a hydroelectric plant when a sudden stoppage occurs affecting its power generation units or discharge spillways. Load rejection can arise as a result of automatic shutoffs caused by internal or external failures:

- Internal. These situations relate to technical problems within the power plant that require the stoppage of the turbines. This can arise due to a mechanical failure (valve or turbine failure) or an electrical fault in the mechanisms that operate the generator units, or in the high tension switchgear (switches or power line distributors).
- External. External events can lead to total system failure (black out), which is a less frequent situation. This can be caused by a break in the power transmission line that serves both power plants.

Fortunately, such events are infrequent; by way of illustration, see **EIS Annex 17, Table 3.1**, which shows a summary of load rejections that occurred at the Alfalfal Power Plant from 2004 to 2007.

For further information on the analyses taken into account for different potential cases of failures in the power generation units in the Alto Maipo plants, please see **Annex 17 of the EIS and Annex 16 of Addendum 1**.

Remark N° 322 Employee Encampment

The construction workers' encampments should be sited a considerable distance from settlements, thus avoiding excessive contact between the floating worker population and local residents.

Thematic responses

PRO.03 Works

The PHAM Project consists of the construction and subsequent operation of two run-of-the-river hydroelectric plants in series, with a combined installed power of 531 MW. The power plants shall make use of water abstracted from the upper reaches of the La Engorda, Colina, Las Placas, and El Morado Streams and the El Yeso River downstream of the El Yeso Reservoir, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region.

The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the currently operational Alfalfal I Power Plant, and shall make use of water abstracted from Morado, Las Placas, Colina, and La Engorda Streams, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River.

The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

Most of the installations constructed for the PHAM shall be underground, including both powerhouses, siphons, and headworks - the latter consisting of tunnels. Surface construction works shall consist of the intakes, covered conduits, and new bridges over the Colorado and Yeso Rivers. Plans also call for the creation of service roads, muck disposal heaps, and temporary encampments. All temporary and permanent facilities and installations are included in the environmental evaluation.

PRO.03.03 Encampments and Works Installations

For details on the creation of encampments and works installations, please see Chapter 2, Section 2.3.2.4 in the EIS.

For information on PHAM encampment and work site approach routes, see EIS, Chapter 2, Table 2.1.2,

For information on regulations, see Chapter 3 of the EIS and Annex 33, General Operating Regulations for Encampments and Work Sites.

For information on the management of waste produced at work sites and encampments, see Annex 18 of the EIS, "Site Installation Waste Management Plan".

For information on the discharge of treated wastewater, see Response 26 in the Addendum.

For information on human consumption of water at encampments and works installations, see Chapter 2, Section 2.3.2.4, parts b and i.

For an assessments of the impact of the creation of encampments and works installations, monitoring methods, and conditions, see Chapter 6 of the EIS.

SOC Socio-Economic Impact

Job creation plans for the district will take into account the concerns expressed by community representatives during the advance citizen participation activities conducted, and will include local labor sourcing as one of the positive economic impacts that can be foreseen for the district.

In this regard, under the assumption that at the peak of hiring activities the PHAM will create an estimated 2500 new direct employment jobs during its construction phase, as well as indirect job creation in the district arising through the requirements of services for a project of this type, there will be an injection of capital into the district or local economy bringing benefits in areas such as construction, transport, and general services operating in the district.

During the operations phase, the power plants will pay taxes or license fees to the district, which, together with the fees currently paid, will amount to a figure close to CLP 180,000,000 per year.

SOC.02 Human contingent presence

The presence of Project employees will be temporary (limited both to the years of the construction phase, and to the working day organized into shifts), thus disincentivizing them and their families from moving to the area on a permanent basis. During the Project's construction phase, its employees shall sleep in the encampments described in the documentation, not making use of existing hotels and hostels located in and near the area's settlements.

Once the construction phase has been completed, the Project's installations and encampments shall be removed; they shall therefore not become part of existing settlements, or form new centers for the formation of settlements.

The PHAM plans call for the creation of 5 encampments, located away from settlements. These encampments will be operated as described in Annex 33, and each will house a permanent contingent of 200-400 employees, under the standard working regime adopted by mining installations. The transport of employees from the encampments to their places of residence shall have a frequency determined in accordance with the working shifts. Therefore, it is important to

understand that under no circumstances shall the presence of Project employees in the area lead to the type of interaction with

the resident community and demand for local services that currently occurs as a result of the flow of tourists and visitors, mainly during weekends, holidays, and the summer season.

In view of the above, the Project shall not lead to the following potential impacts: overpopulation at a local or district level (in existing settlements); or effects modifying local customs, economic service provision activities, connectivity, and local load capacity (understood to refer to the load placed on infrastructure and equipment).

As indicated in Annex 39 of the EIS, documentation supporting the analysis described above shall form part of activities under the Social Indicator Monitoring (SIM) program. This monitoring program is based on compiling information using qualitative and quantitative techniques developed in the field of Social Sciences, oriented towards investigating a suite of indices that pay due heed to trends in relevant variables for monitoring, selected in accordance with the characteristics of the Project and of the communities in the area where it is to be implemented. Reports will be issued twice per year containing the results obtained, including the use of graphical aids to show comparative changes in parameters from one study campaign to the next. This document will be delivered to CONAMA.

In general, by gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project may cause in its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities.

Remark N° 323 Maitenes Tailrace

Conditions should be improved in general, as there is currently no protection whatsoever on the side facing the settlement of Maitenes.

Thematic responses

RSG Risk

The Project Owner possesses a general risk prevention strategy that imposes certain measures on the Project during its different stages of advance. This strategy features the following components:

- a) Measures incorporated into the Project's engineering design.
- b) Systematic verification of compliance with applicable regulations
- c) Establishment of restricted areas
 - c.1) Area restricted due to their archeological, paleontological, or heritage value
 - c.2) Area of natural value that requires protection by the Project
 - c.3) Officially protected area.
- d) Expert supervision during construction
- e) Training regarding environmentally sensitive issues
- f) Internal risk management and accident prevention programs
- g) Separation of works installations and encampments

For further information on each of these points, please see **Chapter 7 of the EIS**, which specifies the **Environmental Management Plan**, the **Risk Control and Prevention Plan** designed for the Project, the safety measures to be adopted in light of the risks identified, and, finally, the **Accident control plan**, to be activated in the event of the failure of the preventive measures taken by the Project Owner. Furthermore, **Annex 32 of the EIS** presents the **Risk and Contingency Prevention Plan** for contractors.

RSG.01 Load rejection

During the operation of the power plants, situations may arise that necessitate the stoppage of one or both plants for a certain period of time. Two temporary phenomena occur at such times, the effects of which must be analyzed. These phenomena are mass oscillations within tunnels carrying water under pressure, and impact on the Maipo River system's flow dynamics. A special situation arises in the operation of a hydroelectric plant when a sudden stoppage occurs affecting its power generation units or discharge spillways. Load rejection can arise as a result of automatic shutoffs caused by internal or external failures:

- Internal. These situations relate to technical problems within the power plant that require the stoppage of the turbines. This can arise due to a mechanical failure (valve or turbine failure) or an electrical fault in the mechanisms that operate the generator units, or in the high tension switchgear (switches or power line distributors).
- External. External events can lead to total system failure (black out), which is a less frequent situation. This can be caused by a break in the power transmission line that serves both power plants.

Fortunately, such events are infrequent; by way of illustration, see **EIS Annex 17, Table 3.1**, which shows a summary of load rejections that occurred at the Alfalfal Power Plant from 2004 to 2007.

For further information on the analyses taken into account for different potential cases of failures in the power generation units in the Alto Maipo plants, please see **Annex 17 of the EIS and Annex 16 of Addendum 1**.

Remark N° 325 Upper Maipo Basin Area Usage Flow Rate

The Project plans establish a total water abstraction rate in the Upper Maipo Basin area of 27 m³/s. It is not made clear from where this flow rate will be abstracted, given that the maximum statistical monthly average for flow rate in the Yeso River is approximately 11 m³/s. The question is: will the management of the El Yeso Reservoir cause any intervention? And what we have not mentioned is that **ecological flow rates** should be respected.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.05 Drinking water supply

Construction works and/or activities involved in the project (roads, movement of materials, transport of different products, etc) shall have no effect or impact whatsoever on the quality or security/safety of water supply in the Maipo River system. During the construction phase, Project interventions affecting watercourses shall cause only temporary effects resulting from Earth moving during excavation and other construction activities. This intervention shall affect small areas over short time periods, as it shall last only during the period while these installations are under construction (see **Section 6.4.1.4 of the EIS and Section VII, Question 17, in the Addendum**).

During operations, the PHAM shall not affect the Laguna Negra-Lo Encañado and El Yeso Reservoir system, which is managed by the company Aguas Andinas S.A, in its capacity as holder of the drinking water concession for Santiago; nor shall the Project affect the operational dynamics of the drinking water supply system. Therefore, the implementation of the PHAM does not imply any impact whatsoever on the supply of drinking water (see **Section I, responses 27 and 29, in the Addendum**).

Furthermore, the water abstracted by the Project shall be returned to the river 5 km upstream of the Toma Independiente or Independent Intake, operated by the company Aguas Andinas S.A., which abstracts water for drinking water supply to the city of Santiago; therefore, the PHAM shall not affect normal operations of this system. The PHAM shall only affect the delivery point of water in the tributaries of the Maipo River; in other words, water that currently does not drain into the Maipo River shall not be incorporated into that river's total flow.

However, in the event that an incident may arise as a result of an accident during construction, such as accidental spillages or rock falls, the procedures described in the Contingency Plan shall be implemented, consisting of a suite of actions to solve associated problems. This plan is explained in detail in **Chapter 7 of the EIS, Section 7.2.5.**

AGU.05.01 Drinking water quality

The process of hydroelectric power generation does not affect the physical/chemical qualities of water. Additionally, the PHAM does not plan to implement regulation installations that retain sediment. Thirdly, downstream of the discharge point the natural river conditions are maintained with regard to flow rate and physical/chemical properties.

During the construction of installations to be located in watercourses, the free-flowing course of the river is maintained through the construction of diversions through pipes laid along the river course for such purposes, or through channels that divert all flow, allowing free water circulation with no effect whatsoever on quality (see **Section I, Question 28, in the Addendum**).

The Project owner shall not make use of the Lo Encañado Lake or water usage rights owned by Aguas Andinas S.A. for this Project, instead opting to forgo usage of these resources and to replace the role that would have been fulfilled by the Lo Encañado Lake with a forebay located on a widening of the Alfalfa II plant headworks, located in the Alto Aucayes area on the Colorado River Valley (for details, see **EIS 2.2.1**). The Lo Encañado area shall be assigned a status of controlled access area at all times: it shall not be subject to any intervention whatsoever.

The Project Owner has made available a Water Quality Monitoring Program, with specifications for application during both the construction and operations phases. This program espouses a commitment to verify the effectiveness of environmental control measures designed to minimize the effects of works construction activities during the construction phase.

For further information on the Monitoring Program, see **Sections 8.2 and 8.3** in **Chapter 8 of the EIS.**

Remark N° 326 Ecological Flow Rates and Baseline Studies

The Project establishes an ecological flow rate for the Colorado River at 0.6 m³/s. This flow rate is outside of the bounds stipulated in the DGA Manual of Regulations and Procedures, which specifies that the value must be 10% of average annual flow rate - in this case, 3.1 m³/s plus environmental demand.

Our studies indicate that the Yeso River dries out, the La Engorda Stream dries out, the Colina Stream dries out, the Las Placas Stream dries out, the Morado Stream dries out, and the Colorado River almost dries out, being left with a minimal flow rate. The ecological flow rates defined at the intakes will soak into the ground and not flow along the watercourses in question to their points of confluence with more major rivers, leaving them dry.

Ecological flow rates are determined based on the Environment Law, Law 19,300 and respecting the rights of third parties.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information. The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**). For information on water usage rights held by the Project, see **Table 2.3.4 in Chapter 2 of the EIS**.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17 of the Addendum**.

AGU.04 Flow rates in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers. The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River. The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to

intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as

well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfa and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In light of the information presented in the aforementioned study, which is included as **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part. **AGU.04.04 Monitoring and control of flow rates and water levels**

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate (Qe) approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

The principal environmental protection measure planned for watercourses subject to intervention under the PHAM consists of maintaining an ecological flow rate approved by the DGA. In the case of the PHAM, the analysis of Qe has taken into account not only hydrological variables but also biological information necessary to preserve the aquatic organisms associated with the watercourses.

Ecological flow rates will be maintained in rivers and streams, including those that are currently subject to artificial flow regulation and those that currently maintain natural flow dynamics. This multipurpose measure will minimize impact on the landscape that would be associated with flow reductions, principally in areas with greater visual accessibility (**Addendum, Section 5, Question 2**).

The Project Owner plans to undertake continuous and permanent measurement of ecological flow rates throughout the useful life of the project.

For this purpose, 4 stream gauge stations and 6 control stations will be installed, at the locations specified in the following table:

Sector	Station	Coordinates (UTM)	
		Easting	Northing
	Alto Volcán		
	Rain gauge station		
	406,157		
	Stream gauge station		
	6,259,100		
Alto Volcán	La Engorda Stream Bridge		
	Rain gauge station	460,487	6,358,143
Alto Volcán	El Volcán River Bridge (Volcán South)		
	Control station	407,468	6,259,751
Alto Volcán	La Engorda Intake		
	Control station	406,780	6,260,782
Alto Volcán	Las Placas Intake		
	Control station	407,181	6,260,081
Alto Volcán	Colina Intake		
	Control station	405,768	6,261,231
Yeso River	El Morado Intake		
	Rain gauge station	391,504	6,262,449
Yeso River	PBN (15)		
	Control station	399,666	6,272,077
Colorado River	El Yeso Intake		
	Rain gauge station	380,449	6,287,261
Colorado River	El Sauce		
	Intake control station	389,063	6,292,501
	Colorado River		

With regard to water quality, measurements have been taken along the watercourses involved in the PHAM (see details in **Chapter 5, Section 5.3.5.2**), and an Environmental Monitoring Plan has been drawn up, featuring actions related to maintaining water quality and mitigating potential impacts on tributaries (**EIS, Chapter 7, Section 7.1 and Chapter 8, Section 8.2.3**).

For more information, see **Annex 17 of the Addendum**.

Remark N° 327 Water Rights

The Project does not hold water rights at any abstraction point. The technical report issued by the Directorate General of Water indicates that the water transfers requested by the company cannot be made, because **it does not physically exist** What will you use to generate the energy that you claim to produce?

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as

making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

Remark N° 328 Water Rights

The Project does not hold concessions for water rights at any abstraction point.

A report prepared by the Directorate General of Water (DGA) indicates that this water **does not physically exist**, as the real flow rate is considerably lower than that quoted in the project documentation, and that if any rights come to be granted, the flow rate in question will not be known; therefore, if the baseline study is based on **suppositions regarding flow rates**, how can the environmental impact study be valid and be approved?

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS**.

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS.**

This section presents information characterizing the basins and tributaries of the Volcán,

Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex 13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS.**

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5.**

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS.**

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability

for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 330 Water Rights

The Project does not hold concessions for water rights at any abstraction point.

A report prepared by the Directorate General of Water (DGA) indicates that this water **does not physically exist**, and that if any rights come to be granted, the flow rate in question will not be known; therefore, the baseline study is based on suppositions regarding flow rates.

What is this about, that you want to build a **hydroelectric plant that has no water to use to generate power?**

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS**.

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see **Table 2.3.4** in **Chapter 2 of the EIS**.

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to

be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site information survey campaigns conducted during 2005, 2006, 2007, and

2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS**.

This section presents information characterizing the basins and tributaries of the Volcán, Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex 13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS**.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for

low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

PRO The Project

The PHAM is based on run-of-the-river hydroelectric energy generation, and therefore will feature no reservoirs - instead, it will generate electricity using available water, which will pass through the turbines and then be returned to the river.

This system avoids potential negative impacts on the environment arising from the construction of a dam, which can lead to the loss of fertile land or housing, and consequent effects on residents.

The advantage of this project is that most construction work will be implemented underground, using cutting edge construction technology and minimum surface intervention (**EIS, Chapter 1**). This feature also avoids air pollution that can be caused by excavation activities and earth movement, and leads to insignificant effects on road traffic.

The work sites will be located far away from settlements, with no effect caused by the annoyances that are typical of construction works.

Spoil and muck disposal sites, for the deposition of rock and earth excavated in the creation of tunnels and underground machine rooms, will be located at a number of sites that are not commonly frequented, minimizing their visual impact.

Remark N° 331 Water Rights and Base Study

The Project does not hold concessions for water rights at any abstraction point. Given that the project does not hold the water rights that it hopes to use, and that should such rights be granted, the flow rates conceded are as yet unknown, the baseline study is not valid because it is based on suppositions regarding flow rates.

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on Tourism activities (water sports) undertaken in the Maipo River.

Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.01 Regulations

The Project Owner shall comply with all requirements relating to regulations that apply to water usage for the purposes of the Project; these regulations are issued by the main state services that specialize in this field. Dirección General de Aguas (Directorate General of Water, DGA), Dirección de Obras Hidráulicas (Directorate of Hydraulic Works, DOH), Servicio Agrícola y Ganadero (Agriculture and Livestock Service, SAG), and Health Services.

For details on these regulations, see **Chapter 3, Section 3.2.3 of the EIS.**

AGU.01.02 Transfer of Rights

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project.

Table 2.3.4, which is included in **Chapter 2 of the EIS**, provides details of the instream water usage rights, both permanent and for future usage, continuous and non-continuous, that are to be used by Gener for the operation of the Alto Maipo Hydroelectric Project (PHAM). For each case information is provided on the corresponding riverbed, flow rates granted, intake and point of discharge back into the watercourse, resolutions whereby the rights were granted, and inscription in the corresponding Real Estate Registry.

In order to adjust the rights held by Gener S.A. to the needs of the Alto Maipo Hydroelectric Project, a number of documentary procedures have been submitted to the Dirección General de Aguas (DGA) for the transfer of instream water usage rights, as specified in files VT-1302-226, VT-1302-227, VT-1302-228, VT-1302-229, VT-1302-230, and VT-1302-231, relating to the Las Placas, Maipo Valley, Morado, La Engorda Stream, Colina Stream, Yeso River, and Colorado River watercourses, respectively.

Gener is the holder of rights for the instream usage of 2 m³/s of water from the Aucayes Stream, on a permanent and continuous basis; this right is inscribed in the Puente Alto CBR, sheet 343 N° 536 of the year 1990, with Registry Number 202 in the Public Registry of Water Usage Rights (available for examination in **Section V, Question 24, Section vi of the Addendum**).

AGU.02 Third party water rights

The PHAM, making use of its legally constituted water usage rights, shall not affect the usufruct of water usage rights held by third parties (see **Section I, Question 40 of the Addendum**).

For information on water usage rights held by the Project, see **Table 2.3.4** in **Chapter 2 of the EIS.**

AGU.03 Baseline

The Baseline Study describes the current situation in the Project's area of influence, in order to be able to conduct an evaluation at a later date assessing impacts on aspects of the environment during construction and installation activities, activities and/or actions included in the Project, and subsequent operations.

The baseline studies for environmental components included in the EIS were derived from on-site

information survey campaigns conducted during 2005, 2006, 2007, and 2008, as well as an exhaustive literature search analyzing specific studies and background information for relevant environmental components. Further information was compiled from aerial photographs, thematic maps, and information generated during Project engineering work. For more information, see **Annex 17** of the **Addendum**.

AGU.03.01 Water resources

The baseline studies used in determining existing water resources in the Project area are presented in **Chapter 5.3.5 of the EIS**.

This section presents information characterizing the basins and tributaries of the Volcán, Yeso, and Colorado Rivers, all in the context of the Maipo River Mountain Hydrological System. This characterization describes the current situation of the aspects that are of relevance in the environmental evaluation, and in particular the features related to flow dynamics and the usage of water resources.

A number of sources have been used in the preparation of this characterization: various environmental studies belonging to the Directorate-General of Water (DGA), Meteorological Department of Chile, and Aguas Andinas, as well as the Water Resource Analysis reports conducted by Gener, which are attached in Annex

13 of Addendum 1; this information was used to determine the monthly average flow rates for each of the rivers and streams involved in the Project.

For more in-depth information on water resource baseline information, see **Annexes 13 and 17 of the Addendum, and Section 5.7.1.3 of the EIS**.

AGU.04 Water flow in rivers and streams

The Project plans to make use of water from rivers and streams in conformity with the water rights held by Gener and subject to maintaining ecological flow rates. Therefore, the source of impact shall be the consequent reduction in flow rates with the Project operational, modifying the natural - and in some cases, the regulated - water flow dynamics of certain rivers.

The energy that will be generated by the Project is derived from water resources contributed by the

Engorda, Colina, Las Placas, and El Morado Streams, which are tributaries of the Yeso River and the Colorado River.

The power plants shall make use of water abstracted from the Upper Maipo River Basin, as well as water from the upper and middle reaches of the Colorado River, in the District of San José de Maipo, in the Santiago Metropolitan Region. The first of these power plants, Alfalfal II, is to be installed in the southern section of the Colorado River, downstream of the Alfalfal I Power Plant, and shall make use of water abstracted from the upper reaches of the Volcán River, as well as making use of water flowing out of the El Yeso Reservoir into the El Yeso River. The second of these plants, Las Lajas, is to be situated on the southern bank of the Colorado River, in the El Sauce area, and shall make use of water from the discharge outlets of the Alfalfal I and Alfalfal II power plants, as well as water taken from the middle reaches of the Colorado River.

For further information on the influence of the Project on tributaries in the area, see the **Addendum, Annex 17, and Section IV, Question 5**.

AGU.04.02 Maximum flow rates to be abstracted

Table 2.3.6 presents the design flow rates of the intakes, while Table 2.3.7 shows maximum, average, and minimum flow rates for each section of conduit to be constructed as part of the Project; all of this information is to be found in **Chapter 2, Section 2.3.3.1 of the EIS**.

AGU.04.03 Ecological flow rates

The ecological flow rate is defined as the minimum value for water flow that must pass through a stretch of a river in order to maintain ecosystems. The operation and construction of power plants requires an ecological flow rate (Q_e) study, given that the intakes shall modify the natural conditions present in the rivers, making it necessary to identify the biological communities present in the river, as well as the ecological conditions under which they exist, and the minimum hydrodynamic requirements for their habitats to be maintained.

The analysis of the ecological flow rate of a river is conducted by means of the application of a suite of methodologies that have been defined through the implementation of advanced studies in this field, such as to derive a minimum rate of water flow that must pass through the different sections of these rivers. These Q_e zones are defined in the rivers that are to be subject to intervention by means of a systematic characterization of the watercourses, centered on conducting a hydrological, biological, morphological, and hydraulic characterization of them, with the aim of determining the areas that are most vulnerable to impact through reduction in river flow rates.

In the case of the PHAM, ecological flow rates have been established for the Yeso, Volcán, and Colorado Rivers, as well as the La Engorda, Colina, Las Placas and El Morado Streams.

It is important to underscore that the flow rate in the Maipo River features a series of regulated flow rates, such as the El Yeso Reservoir, and statistics available from these sources indicate that flow rate through the river drops to zero (0) during certain months. Other artificial modifications in the natural state of the hydrological system relate to the presence of the Alfalfal and Maitenes run-of-the-river power plants, which have been functional using water from the Colorado River since 1991 and 1923, respectively; as well as the Volcán and Queltehues plants, both operating in the Volcán River sub-basin since the 1940s.

Gener has conducted a reevaluation of ecological flow rates in each of the rivers and streams that will suffer a reduction in flow rate due to the operation of the PHAM. This study has been conducted through the identification of critical control sections, and the evaluation of areas known as Areas of Environmental Importance (AEI), in order to determine the minimum flow rate that must pass through these areas, taking into account aquatic organisms, human activities, water quality, and effects on the landscape.

To this end, a hydro-environmental study was applied to all of the rivers and streams concerned, including a description of the systems in terms of biological components (benthic wildlife, benthic autotrophs, zooplankton, phytoplankton, and fish species present) and abiotic components (stream morphology, flow depth, flow velocity, substrate type, and physical and chemical

variables related to water quality). Elements related to human activities and landscape value are also included.

In view of information contained in this study, which is provided in **Annex 17 of Addendum 1**, and taking into account levels of intervention currently found in the rivers of the basin - particularly the Yeso River - Gener considers it appropriate to apply the principle of habitability for low water summer flow rates, with an exceedence probability of 85%, additionally complemented with a Management Plan to help to neutralize existing environmental deficits, at least in part.

Remark N° 332 Auxiliary Discharges

For the free discharge flow of the different channels, used for excess water or emergencies, these channels and the natural watercourses into which they drain should be in good conditions, free of obstacles that could impede free flow; in this case, particular care should be taken with the Aucayes Stream, which passes along one side of the settlement of Maitenes, to prevent erosion of that riverbank. This leads to a need to built erosion protection (riprap).

Thematic responses

AGU Water

The Project shall generate electricity using water taken from the Morado, Las Placas, La Engorda, and Colina streams, and from the Yeso and Colorado Rivers, over which the project owner holds instream water usage rights. These rights were granted by the DGA in accordance with the hydrology of each of the watercourses involved, establishing ecological flow rates for each of them, which must be respected by the Project. Gener is currently engaged in requesting adjustments to these rights to bring them into line with project requirements. Nonetheless, the Project's base line studies included a hydrological study of the watercourses involved, calculating flow rate times series for each of the

rivers and streams to be used by the Project, over a period of 50 years. These studies were conducted based on prior hydrological studies, current flow rate data provided by the Dirección General de Aguas (DGA) and by Gener itself, as well as other information.

The studies included in the project's EIS indicate that the estimated reduction in flow rates shall not cause any impact on aquatic organisms or on biodiversity in areas surrounding the watercourses, or on

tourism activities (water sports) undertaken in the Maipo River. Conversely, the Project Owner guarantees that it shall respect water rights held by third parties, and shall make any necessary adjustments to existing water intake works located within the project's area of influence such as to maintain their functionality, in all applicable cases.

AGU.06 Sediment

Gener has conducted a sedimentation study on the Maipo River, whereunder it was determined that sediment load reduction figures relate to solid transport capacity, and not to the effective solid transport rate. Figures on effective transport rate are less certain due to the precariousness of information on aggregates extraction currently undertaken in the Maipo River. See the response to **question 22 b 9, Section I of the Addendum.**

Additionally, it must be borne in mind that methodologies used in the calculation of solid streambed wear in these rivers leads to uncertainties in the results amounting to 2 or more orders of magnitude, and therefore "a relatively broad range of values must be accepted for the purposes of analysis and design" (**chapter 6.1 of the Sedimentation Study presented in Annex 20 of the EIS**).

The discharge a flow rate of 65 m³/s into the Maipo River in the Las Lajas area will represent approximately 40% of the water naturally passing this point in the Maipo River, during the snow melt season (average annual flow rate for the October to March period at the Maipo stream gauge station at El Manzano is 161.36 m³/sec). In particular, during the month of January it will represent no more than 30% of River flow passing that point.

Conversely, even though the quantity of sediment in suspension is expected to drop in proportion to drop in flow rate, the values reported (page 4 of Annex 20 of the EIS) represent an upper limit, given that the analysis undertaken did not take into account the fact that the sand traps will remove up to 15% of solids in suspension in the inflowing water, as they are designed to trap particles larger than 0.15 mm in diameter (in the case of the Colorado and Olivares Rivers flowing into the Alfalfa Plant); 85% of sediment in water that reaches the sand trap is of a particle size smaller than 0.15 mm. Therefore, the water flow returned to the Maipo River should be expected to contain 85% of the sediment in suspension of naturally present in the watercourses from which the water is abstracted, the rest being returned to the original watercourses during periodic sand trap flushing.

As solid transport in suspension represents 27% of total solid transport, the real effects to be expected from the reduction in sediment in suspension amounts to a mere 1.8% drop in total solid transport in the Maipo River at Las Vertientes.

AGU.06.04 Discharge effects

Water capture in advance of in-situ gravel removal leads first to a reduction in sediment load in water carried through the headworks to the turbine rooms, while the solid material that is retained is returned to the river. At the point where water is discharged from the plants (Las Lajas area), water that has passed through the turbines - which contains a certain quantity of sediment - once again mixes with the water in the rivers, returning to its original conditions in terms of average sediment load (**Addendum, Section I, Question 28**).

At the point where water is returned to the Maipo River, in the Las Lajas area, there will be no degradation of the riverbed as it is composed entirely of rocks. It should be mentioned that the flow rate discharged from the PHAM at this point is always lower than the flow rate in the Maipo River just upstream.

During the operations phase of the Project, planned maintenance activities do not include any cleaning of tunnels and culverts. Inside the tunnels, the cross sectional area for water flow is small enough to prevent sedimentation. This is shown through the operation of the Alfalfa Plant for 20 years without any cleaning of the tunnels being included among maintenance activities. The only operations that lead to the discharge of sediment are the discharge of gravel traps at the inlets, and the flushing of the sand traps, returning sediment to the river once a certain volume has built up within them. These operations are conducted intermittently and for short time periods (1 minute for sand traps, 10 minutes for gravel traps), at variable frequency depending on the season. For more information see the **Addendum, Section IV, Question 3.**

RSG Risk

The Project Owner possesses a general risk prevention strategy that imposes certain measures on the Project during its different stages of advance. This strategy features the following components:

- a) Measures incorporated into the Project's engineering design.
- b) Systematic verification of compliance with applicable regulations
- c) Establishment of restricted areas
 - c.1) Area restricted due to their archeological, paleontological, or heritage value
 - c.2) Area of natural value that requires protection by the Project.

- c.3) Officially protected area.
- d) Expert supervision during construction
- e) Training regarding environmentally sensitive issues
- f) Internal risk management and accident prevention programs g)
Separation of works installations and encampments

For further information on each of these points, please see **Chapter 7 of the EIS**, which specifies the **Environmental Management Plan**, the **Risk Control and Prevention Plan** designed for the Project, the safety measures to be adopted in light of the risks identified, and, finally, the **Accident control plan**, to be activated in the event of the failure of the preventive measures taken by the Project Owner. Furthermore, **Annex 32 of the EIS** presents the **Risk and Contingency Prevention Plan** for contractors.

RSG.01 Load rejection

During the operation of the power plants, situations may arise that necessitate the stoppage of one or both plants for a certain period of time. Two temporary phenomena occur at such times, the effects of which must be analyzed. These phenomena are mass oscillations within tunnels carrying water under pressure, and impact on the Maipo River system's flow dynamics.

A special situation arises in the operation of a hydroelectric plant when a sudden stoppage occurs affecting its power generation units or discharge spillways. Load rejection can arise as a result of automatic shutoffs caused by internal or external failures:

- Internal. These situations relate to technical problems within the power plant that require the stoppage of the turbines. This can arise due to a mechanical failure (valve or turbine failure) or an electrical fault in the mechanisms that operate the generator units, or in the high tension switchgear (switches or power line distributors).
- External. External events can lead to total system failure (black out), which is a less frequent situation. This can be caused by a break in the power transmission line that serves both power plants.

Fortunately, such events are infrequent; by way of illustration, see **EIS Annex 17, Table 3.1**, which shows a summary of load rejections that occurred at the Alfalfal Power Plant from 2004 to 2007.

For further information on the analyses taken into account for different potential cases of failures in the power generation units in the Alto Maipo plants, please see **Annex 17 of the EIS and Annex 16 of Addendum 1**.

Remark N° 333
Colorado River at Alfalfal, Riverbank Erosion

Riprap is necessary on the edge of the Colorado River at the populated area of El Alfalfal, as riverbank erosion could directly damage the houses in this area.

This riprap will be a protective measure.

Thematic responses

CAL Impact on Quality of Life

All of the communities consulted by the Project Owner - El Canelo, El Manzano, Los Maitenes, El Alfalfal, San Gabriel, El Romeral, El Volcán, Lo Valdés, Baños Morales, and San José de Maipo - show certain levels of development in services linked to recreational and educational activities related to contact with and enjoyment of natural environments, as a result of the District's high value in this area.

In light of these characteristics, the Project has developed a suite of measures designed to minimize its impact through conserving the environment, such as: most infrastructure construction will be underground; maintenance of ecological flow rates; offsetting vegetation subject to impact; protections of meadows/wetlands; etc.

Similarly, the Project has enacted a suite of further measures to prevent interference with traditional livestock industries, as well as tourism and mountain sports.

Thus, the PHAM has adopted measures to avoid the disappearance or modification of land use patterns or type of land use, and loss in income during the construction and operations phases, as well as mitigating possible impacts on quality of life. For more information, please see the legislation affecting the Project (**EIS, Chapter 3**), the Environmental Management Plan (**EIS, Chapter 7**), and the Environmental Monitoring Plan (**EIS, Chapter 8**); together, these measures are designed to protect the PHAM's natural and human environment.

The Project will feature a very low percentage of surface works, none of which is located in populated areas or near to homes or settlements, with the exception of the settlement of Alfalfal. Additionally, the Project's environmental management activities will prevent it from causing a reduction in the area's environmental quality, with most of its impacts being either imperceptible, or present only during a time period limited to the works construction phase. Therefore, the Project will not bring about negative effects on environmental conditions that could result in a reduction in local residents' quality of life, or harm to the conceptual and/or symbolic features of the surroundings that are valued by families with long histories in the area, as well as those who have moved there more recently.

Chapter 5 of the EIS provides in-depth information on the "Human Environment" of the settlements that are located within the PHAM's area of influence: San José de Maipo, El Canelo, El Alfalfal, Los Maitenes, El Manzano, San Gabriel, Baños Morales, and Lo Valdés. Each of these settlements was the subject of studies addressing issues including principal economic activities, such as the livestock sector and activities linked to tourism and mountaineering, identifying the areas of access and times required. The population's social structure was also studied, as well as the characteristics of constructions and infrastructure, and coverage of basic services; all of this research permitted the estimation of the potential interference that the Project may cause in the area.

The encampments to be constructed are not expected to have any impact on the communities, as they will be located at a significant distance from settlements and subject to strict management of personnel lodged at them. The Project's transport activities will also not interfere with existing road traffic, as journey times along roads used will not be increased.

The evaluation program that has been conducted shows that the Project will not cause any negative impacts on the valuation of the area's constructions and settlements through any potential effects on quality of life linked to social and family connections, or security/safety, as the floating population of Project personnel will remain at the encampments and work sites, all of which are located at a significant distance from populated areas.

The Project will not cause any interference with traditional activities, and the studies have found no predicted impacts during its operations phase in any of the areas discussed, as the scope of the Project will be limited to the functioning of its works.

These statements are based on the opinions of experts in socio-environmental issues, and on experience from similar projects in the same area. In the case of Gener's Alfalfal Project, which was constructed in the Colorado River valley, it was found that during and after construction activities, the local community suffered no adverse effects associated with the loss of cultural characteristics.

Positive impacts have also been identified:

- i) relating to road improvement and maintenance, as well as the opening of new sections of road, which will improve connectivity and access, thus boosting property values and helping local families to continue to inhabit the more remote parts of the Project area, reducing emigration and thus strengthening social and family bonds;
- ii) Local Labor Hiring, and demand for complementary services related to works activities, fostering the dynamism of all activities in the District of San José de Maipo; iii) Improvement in quality of life for many families, as family members return to work in the District.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating monetary contributions that the company has publicly agreed to make to the community, as well as procedures and mechanisms for the usage of these funds and the duration of the program concerned.

In order to provide guarantees regarding of these measures, a Social Indicator Monitoring Program will be implemented, in order to control and verify the Project's impact on its human environment. By gaining solid, up-to-date knowledge of the types of impact, both positive and negative, that a project brings to its host communities, it is possible to make pertinent decisions both in order to leverage benefits and to mitigate or compensate for any harmful effects - a key element to underpin and preserve long term relationship of mutual wellbeing with surrounding communities. The principal characteristics of this program are specified in the **EIS, Chapter 8, Section 8.2.7** and in **EIS Annex 39**.

CAL.01 Contributions to the community

In line with Gener's policy on local integration and cooperation with the development of the communities in which it participates, during the development of the Alto Maipo project the company's Maitenes agrees to make a concrete contribution to local education for employability, tourism promotion, sports and leisure areas, and social projects of interest to the community. In light of observations made during the citizen participation process, Gener considers such activities to be key to the growth of the district and its residents in the medium and long term. This initiative will take shape based on the recommendations of a council of community members, local authorities, and company representatives, which will be free to decide on how such resources are used.

The company is currently engaged in talks with the principal social organizations of the district of San José de Maipo, evaluating procedures and mechanisms for the usage of these funds and the duration of the program concerned.

This commitment will apply only if the Alto Maipo Project is executed.

OTR.01 **Requests**