

REPORT

Central Térmica de Temane Project - Influx Management Framework

Moz Power Invest, S.A. and Sasol New Energy Holdings (Pty) Ltd

Submitted to:

Ministry of Land, Environment and Rural Development (MITADER)

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ACRONYMS

Acronym	Description
CPF	Central Processing Facility
CSR	Corporate Social Responsibility
CTT	Central Térmica de Temane
EDM	Electricidade de Moçambique
IFC	International Finance Corporation
IMP	Influx Management Plan
MPI	Moz Power Invest, S.A.
SNE	Sasol New Energy Holdings (Pty) Ltd
NGO	Non-Governmental Organisation
PSs	Performance Standards

1.0 INTRODUCTION

1.1 Background

The Mozambican economy is one of the fastest growing economies on the African continent with electricity demand increasing by approximately 6-8% annually. In order to address the growing electricity demand faced by Mozambique and to improve power quality, grid stability and flexibility in the system, Moz Power Invest, S.A. (MPI), a company to be incorporated under the laws of Mozambique and Sasol New Energy Holdings (Pty) Ltd (SNE) in a joint development agreement is proposing the construction and operation of a gas to power facility, known as the Central Térmica de Temane (CTT) project. MPI's shareholding will be comprised of EDM and Temane Energy Consortium (Pty) Ltd (TEC). The joint development partners of MPI and SNE will hereafter be referred to as the Proponent. The Proponent proposes to develop the CTT, a 450MW natural gas-fired power plant.

The proposed CTT project will draw gas from the Sasol Exploration and Production International gas well field via the phase 1 development of the PSA Licence area, covering gas deposits in the Temane and Pande well fields in the Inhassoro District and the existing Central Processing Facility (CPF). Consequently, the CTT site is near the CPF. The preferred location for the CTT is approximately 500 m south of the CPF. The CPF, and the proposed site for the CTT project, is located in the Temane/Mangugumete area, Inhassoro District, Inhambane Province, Mozambique; and approximately 40 km northwest of the town of Vilanculos. The Govuro River lies 8 km east of the proposed CTT site. The estimated footprint of the CTT power plant is approximately 20 ha (see Figure 8).

The CTT project is expected to induce in-migration of job and business seekers into the project area. Consequently, Golder Associados Moçambique Limitada (Golder) has prepared this influx management framework for the client guided by the 2007 International Finance Corporations (IFC's) handbook for addressing project-induced in-migration. This section provides an overview of the proposed CTT project and the projected in-migration areas. Additionally, the objectives of the influx management framework will be highlighted in this section.

1.2 Project overview

The CTT project will produce electricity from natural gas in a power plant located 500m south of the CPF. The project will consist of the construction and operation of the following main components:

- Gas to Power Plant with a generation capacity of 450MW;
- Gas pipeline (± 2 km) that will feed the Power Plant with natural gas from the CPF;
- 400kV Electrical transmission line (± 25 km) with a servitude that will include a fire break (vegetation control) and a maintenance road to the Vilanculos substation. The transmission line will have a partial protection zone (PPZ) of 100m width. The transmission line servitude will fall inside the PPZ;
- Water supply pipeline from one or more borehole(s) located either on site, or at borehole located east of the Govuro River;
- Surfaced access road to the CTT site and gravel maintenance roads within the transmission line and pipeline servitudes;
- Temporary beach landing structures at Inhassoro for delivery of equipment and infrastructure to build the power plant. These structures will include transshipment and barging equipment to bring equipment to the beach landing site for approximately 1-2 days with up to 3-4 months between shipments over a period of approximately 8-15 months;
- Construction camp and contractor laydown areas adjacent to the CTT power plant site; and

- Temporary bridge structures across the Govuro River and tributaries, as well possible new roads and road upgrades to allow equipment to be safely transported to the site during construction.



Figure 1: Examples of gas to power plant sites (source: www.industcards.com and www.wartsila.com)

The final selection of technology that will form part of the power generation component of the CTT project has not been determined at this stage. The two power generation technology options that are currently being evaluated are:

- Combined Cycle Gas Turbine; and
- Open Cycle Gas Engines.

Please refer to Chapter 4 of the main environmental and social impact assessment document for further details on the technology option.

At this early stage in the project, a provisional layout of infrastructure footprints, including the proposed linear alignments is indicated in Figure 8. A conceptual layout of the CTT plant site is shown below in Figure 2.

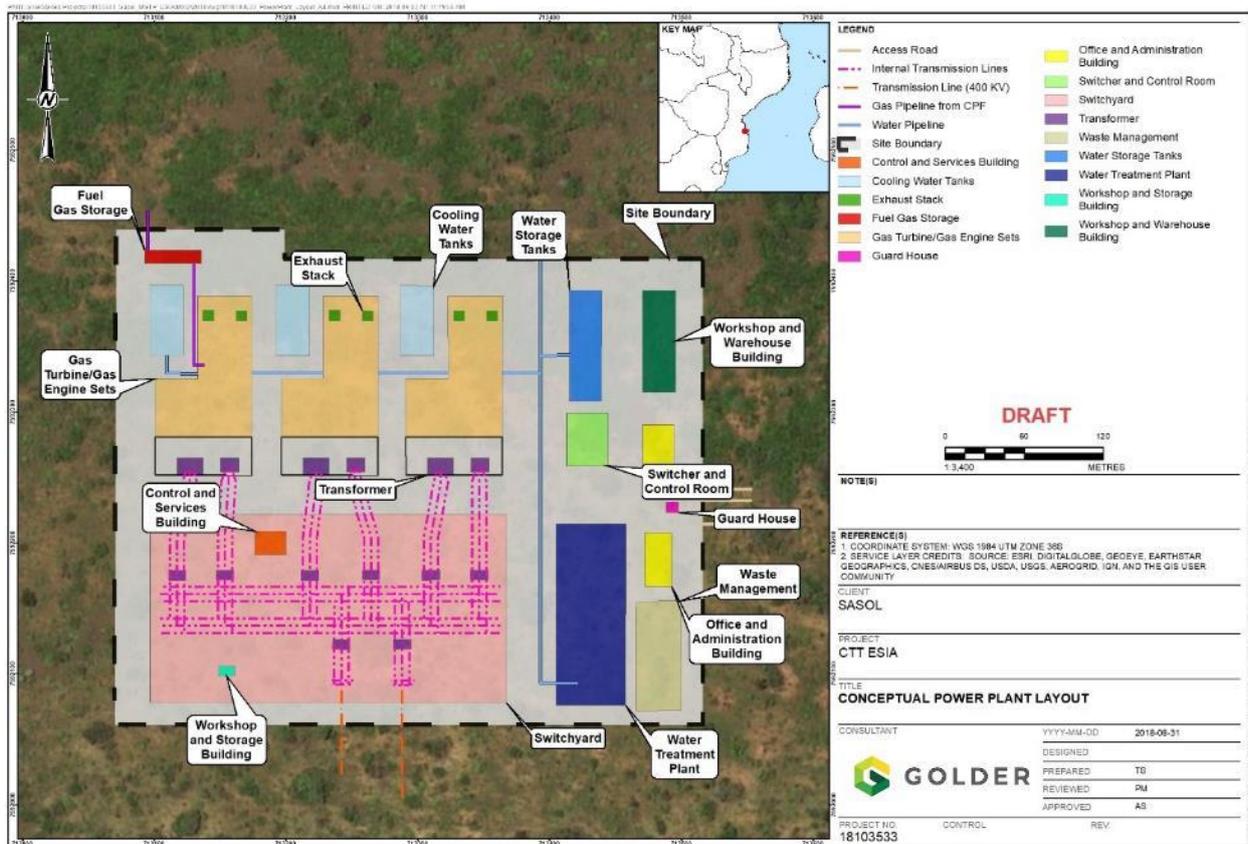


Figure 2: Conceptual layout of CTT plant site

1.2.1 Ancillary infrastructure

The CTT project will also include the following infrastructure:

- Maintenance facilities, admin building and other buildings;
- Telecommunications and security;
- Waste (solid and effluent) treatment and handling and disposal by a third party;
- Site preparation, civil works and infrastructure development for the complete plant;
- Construction camp (including housing/accommodation for construction workers); and
- Beach landing laydown area and logistics camp.

The heavy equipment and pre-fabricated components of the power plant will be brought in by ship and transferred by barge and landed on the beach near Inhassoro. The equipment and components will be brought to the site by special heavy vehicles capable of handling abnormally heavy and large dimension loads. Figure 3, Figure 4 and Figure 5 show examples of the activities involved with a temporary beach landing site, off-loading and transporting of large heavy equipment by road to the site.



Figure 3: Typical beach landing site with barge off-loading heavy equipment (source: Comarco)



Figure 4: Example of large equipment being offloaded from a barge. Note the levels of the ramp, the barge and the jetty (source: SUBTECH)



Figure 5: Heavy haulage truck with 16-axle hydraulic trailer transporting a 360 ton generator (source: ALE)

1.2.2 Water and electricity consumption

The type, origin and quantity of water and energy consumption are still to be determined based on the selected technology to construct and operate the CTT plant. At this stage it is known that water will be sourced from existing boreholes located on site or east of the Govuro River for either of the technology options below:

- Gas Engine: $\pm 12 \text{ m}^3/\text{day}$; or
- Gas Turbine (Dry-Cooling): $\pm 120 - 240 \text{ m}^3/\text{day}$.

1.2.3 Temporary beach landing site and transportation route alternative

As part of the CTT construction phase, it was considered that large heavy equipment and materials would need to be brought in by a ship which would remain anchored at sea off the coast of Inhassoro. Equipment and materials would be transferred to a barge capable of moving on the high tide into very shallow water adjacent to the beach to discharge its cargo onto a temporary off-loading jetty (typically containers filled with sand) near the town of Inhassoro. As the tide changes, the barge rests on the beach, and off-loading of the equipment commences.

Currently, the SETA beach landing site is the preferred beach landing site together with the road route option to be used in transporting equipment and materials along the R241 then the EN1 then via the existing CPF access road to the CTT site near the CPF Figure 6 and Figure 7. indicate the beach landing site and route transportation option. The alternative beach landing sites of Maritima and Briza Mar are still being evaluated as potential options, as well as the southern transport route, which would also require road upgrades and a temporary bridge construction across the Govuro at the position of the existing pipe bridge. As part of the transportation route, the Govuro River bridge may need to be upgraded and strengthened to accommodate the abnormal vehicle loads. Alternatively, a temporary bypass bridge will be constructed adjacent to the existing bridge.

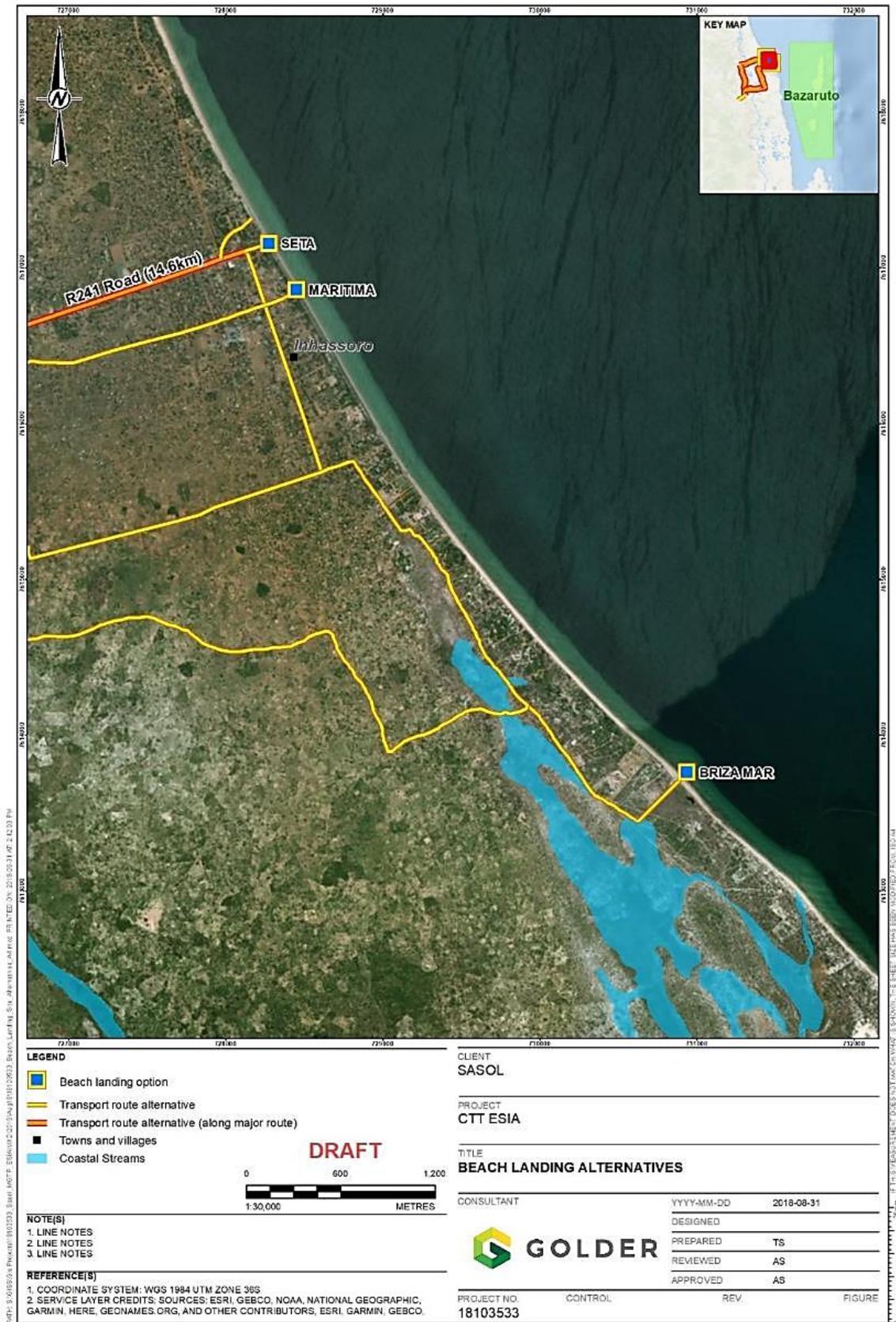


Figure 6: The three beach landing site options and route options at Inhassoro

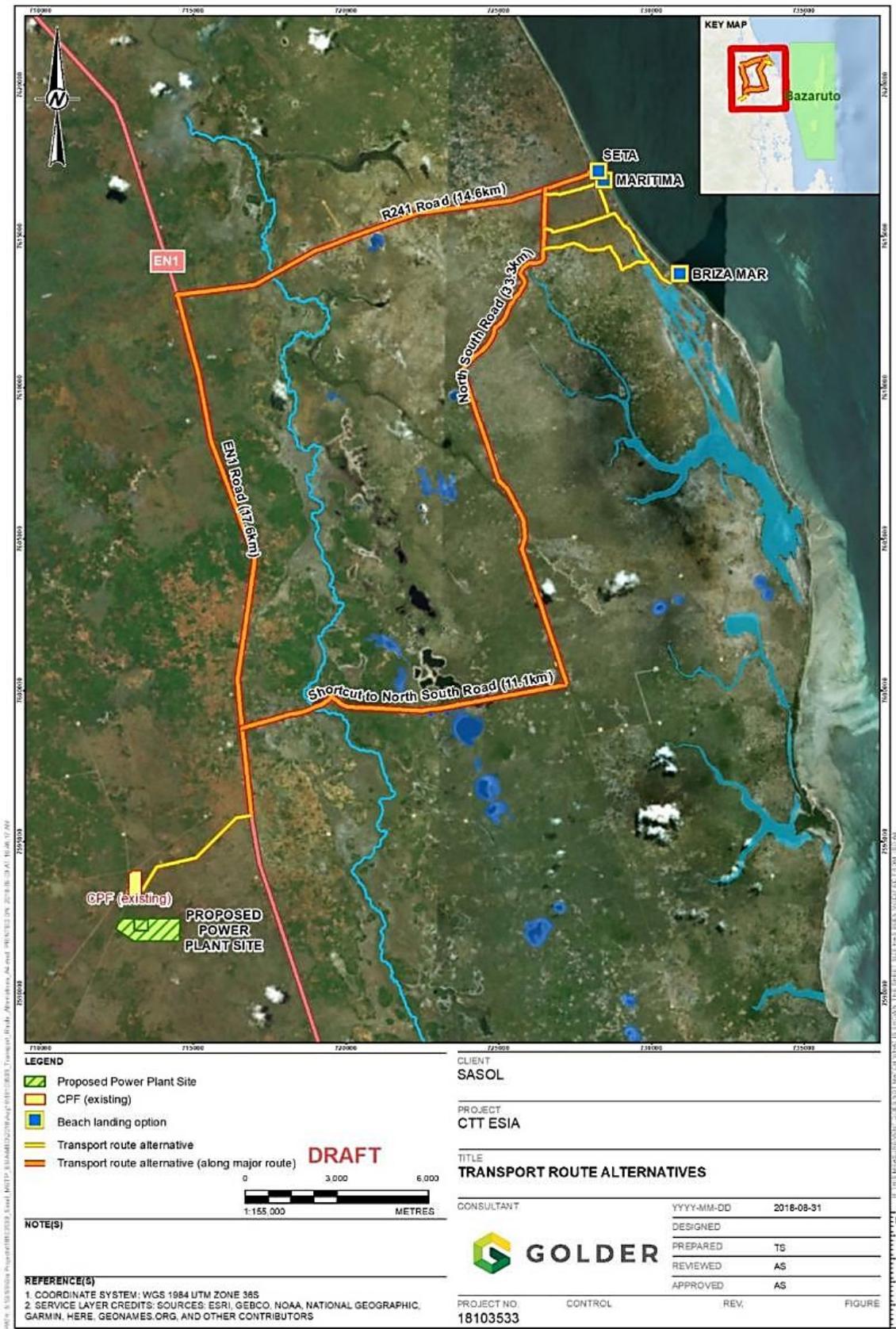


Figure 7: The two main transportation route alternatives from the beach landing sites to the CTT site

1.3 Projected in-migration areas

The proposed project site is in the Temane/Mangugumete area, Inhassoro District, Inhambane Province, Mozambique; and approximately 40 km northwest of the town of Vilanculos (Figure 8).

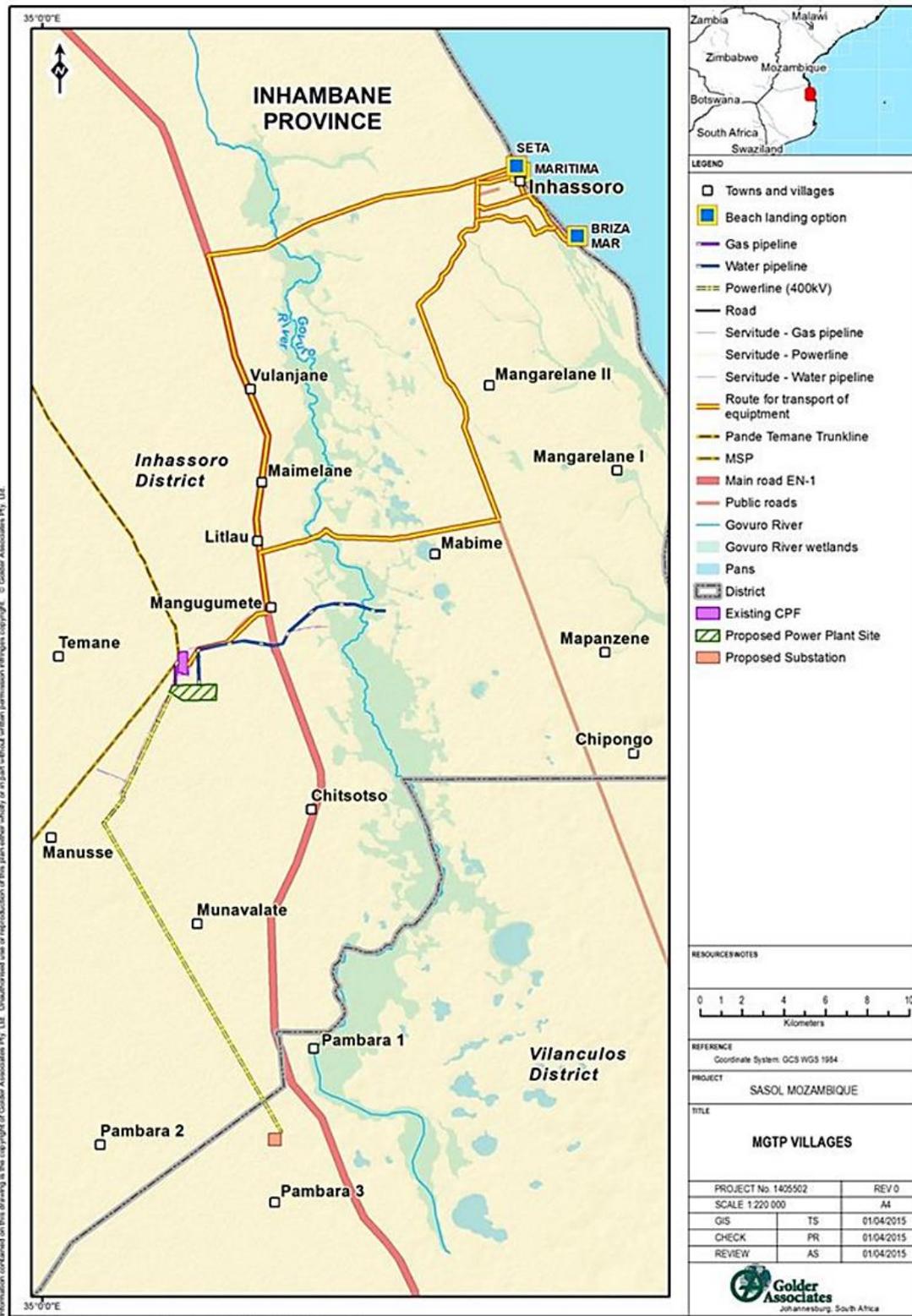


Figure 8: Project location

During any development, it is anticipated that employment and business seekers will migrate to larger towns and communities. Based on the 2018 socio-economic baseline updated by Golder, an influx of work and opportunity seekers has been observed over the past years in Mangungumete and Maimelane because of Sasol’s growing presence in the area (Figure 9 and Figure 10). Mangungumete and Maimelane community size have increased between 2005 and 2010, 72.46% and 58.45%, respectively. The size of these communities is expected to increase if in-migration is not effectively managed, monitored and evaluated.

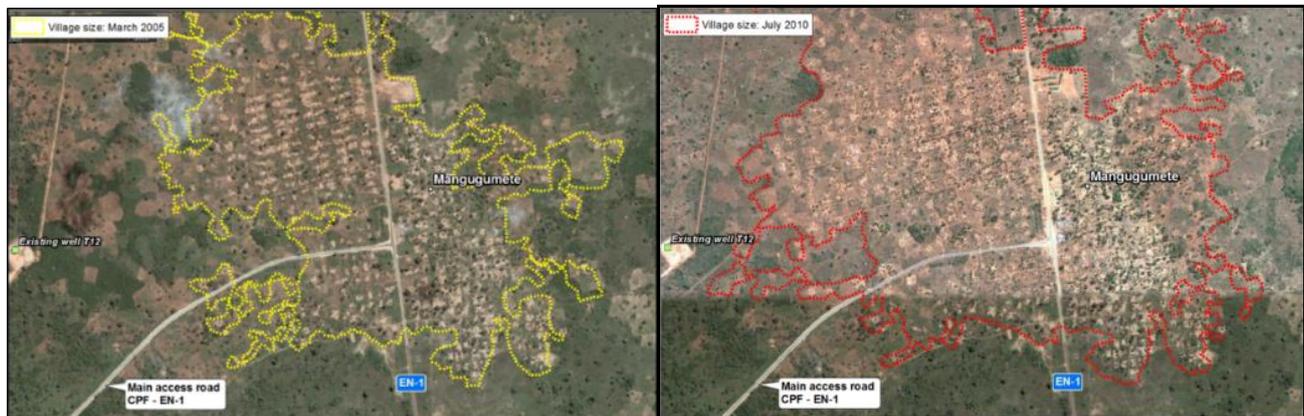


Figure 9: Mangungumete village in 2005 and 2010 (Google Earth imagery)

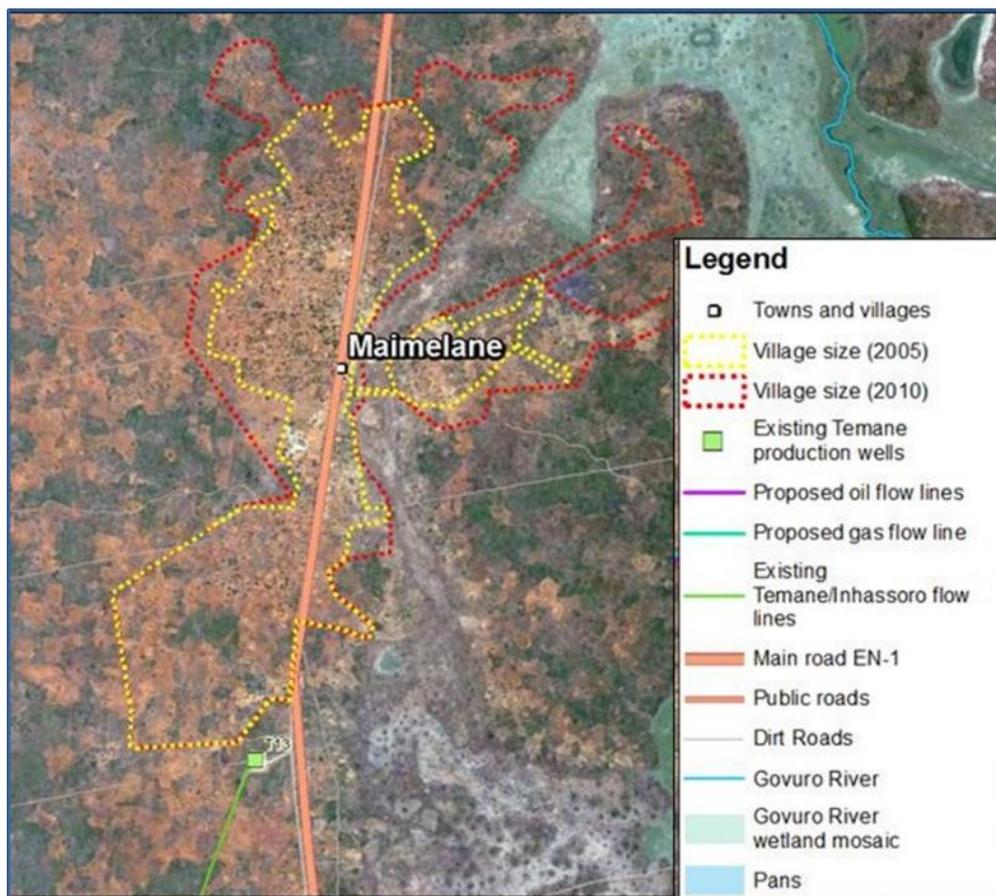


Figure 10: Maimelane community between 2005 and 2010 (Google Earth imagery)

1.4 Objectives

The key purpose of this influx management framework is to provide a clear set of actions for the mitigation, management, monitoring and evaluation of impacts linked to project-induced in-migration. The main objectives of the influx management framework are to provide the client with:

- A management plan for in-migration impacts; and
- An in-migration monitoring and evaluation system for the proposed CTT project.

2.0 INSTITUTIONAL AND LEGAL FRAMEWORK

2.1 CTT health, safety and environment policy

The development of an influx management framework is normally guided by the Proponent’s Health, Safety and Environment Policy.¹ We have therefore developed this influx management framework as a generic framework which will further be refined once the Proponent has developed its own policies for implementation. The development of this influx management framework has also been guided by international good practice and relevant standards as described below.

2.2 Mozambique regulatory requirements

The influx management framework is guided by the Mozambique regulatory requirements as shown in Table 1.

Table 1: Mozambique regulatory requirements which apply to this framework

Applicable regulatory requirements	Reference where applicable
The environmental Act (Law No. 20/97)	This framework considers the precautionary principle that focuses on preventing the occurrence of significant or irreversible negative environmental or social impacts.
Corporate social responsibility ²	This framework considers that the client should bear the responsibility of contributing towards sustainable development, including health and wellbeing of society, as their activities and decisions have an impact on society and the environment.

2.3 International standards

The influx management framework is guided by international good practice regarding in-migration, considering the WBG OP4.03 PS1 AND 4. Table 2 shows the key performance standards (PSs) that apply to this framework.

Table 2: IFC PSs which apply to this framework

Applicable performance standards	Reference where applicable
Performance Standard 1: Social and environmental assessment and management system	The framework considers all social and environmental aspects related to the project.
Performance Standard 4: Community health, safety and security	The framework considers areas of risk viz., housing and respiratory issues, vector-related diseases, sexually

¹ Note: Due to the early stage of this project, the proponent team has yet to formulate and adopt its own set of policies for the CTT project.

² Note: Due to the early stage of this project, the proponent team has yet to formulate a corporate social responsibility policy for the CTT project.

Applicable performance standards	Reference where applicable
	transmitted infections, soil and water-borne diseases, food and nutrition related issues, accidents or injuries, exposure to potentially hazardous materials, social determinants of health, cultural health practices, health services infrastructure, non-communicable diseases, veterinary medicine, behavioural issues (exposure to drug and alcohol abuse, gender-based violence, sexual exploitation and abuse, violence and crime).

3.0 THE MANAGEMENT OF PROJECT-INDUCED IN-MIGRATION IMPACTS

This section provides a summary of the projected in-migration impacts which will have to be managed. The management measures aimed at minimising these impacts are also highlighted in this section.

3.1 Projected in-migration impacts

Environmental and socio-economic impacts are likely to result from the CTT project. Table 3 shows a summary of the projected in-migration impacts.

Table 3: Projected in-migration impacts

Category	Impact	Description
Environmental	Increased pressure on natural resources	The movement of people into the project area will result in increased pressure for natural resources. Consequently, contributing to the following: <ul style="list-style-type: none"> ■ Deforestation. ■ Soil degradation. ■ Water pollution. ■ Land pollution.
Social	Cultural heritage	Increased movement of in-migrants with different cultures and belief systems within the project areas will result in the potential breakdown of traditional institutions, leadership structures and cultural norms. Consequently, this could result in a loss of community identity and resilience.
	Conflict	It is likely that the client will out-source skilled labour from other provinces or countries. It is, therefore, feasible to consider the likelihood that <i>conflict</i> might arise, particularly around the allocation of employment and associated opportunities. One possible reason for such conflict would be the perception among locals that “outsiders” are taking up jobs that could have gone to unemployed

Category	Impact	Description
		members of the local community.
	Food and nutrition security	In-migration may also take up land that could be used for agriculture production. Consequently, in-migration is likely to increase the pressure on food demand and supply, consequently triggering food inflation, which may result in serious health consequences for vulnerable populations.
	Increased pressure on existing infrastructure	Any additional influx of job-seekers will place substantial pressure on local infrastructure such as roads, clinics, schools, sanitation and water access, and housing.
	Safety and security	Increased economic activities, and the anticipated commercial traffic within the project area will expose the locals to social risks such as crime and road accidents.
	Vulnerable groups	It is anticipated that women and children will be abandoned when the construction phase ends and the migrants move on, leaving single, vulnerable, female heads of households.
Economic	Price inflation and economic vulnerability	In-migration into the project area will result in increased price inflation and economic vulnerability. Consequently, there will be an increase in the cost of basic goods and services due to increased demand.
	Access to disposable income	Access to disposable income may result in the increased incidences of prostitution and cause sex relations. As a result, this could lead to increased sexually transmitted infections, including HIV/ AIDS.

3.2 Impact management measures

Although it is anticipated that in-migration impacts during construction phase may be more significant than any other time in the project cycle, the management measures described in this section should be considered throughout the life cycle of the project.

3.2.1 In-migration planning

It is recommended that the client develops and implements a comprehensive Influx Management Plan before the commencement of the project, with relevant stakeholders consulted during this process. The core components of the plan should include the following:

- A clear description of the project affected areas;
- Status of current influx;

- Factors likely to give rise to an influx;
- Areas likely to be affected by the influx;
- Potential risk and impacts associated with the projected influx;
- Proposed influx impacts management approaches;
- Stakeholders responsible for the management of in-migration impacts;
- Stakeholders to consult during the management of In-migration; and
- In-migration monitoring measures.

3.2.2 Stakeholder consultation

The active consultation of stakeholders is an essential part of in-migration management. Therefore, Golder recommends that the client consults various stakeholders when deciding the appropriate impact management and monitoring measures for the CTT project. The purpose of the engagement will be to:

- Discuss issues, risks and opportunities linked to in-migration;
- Understand the concerns of local communities;
- Raise awareness of risk and opportunities; and
- Identify solutions to issues relating to in-migration.

Table 4 shows a list of stakeholders which should be consulted by the client during in-migration planning and management, this list should be reviewed and updated throughout the in-migration management, monitoring, and evaluation process.

Table 4: Stakeholders to consult for in-migration planning and management

Category	Sub-category	Description
Decision makers	National government	<ul style="list-style-type: none"> ■ Ministry of Land, Environment and Rural Development. ■ Ministry of Mineral Resources and Energy. ■ Ministry of Economy and Finance. ■ Ministry of Agriculture and Food Security. ■ Ministry of Public Works, Housing and Water Resources. ■ Ministry of the Sea, Inland Waters and Fisheries. ■ Ministry of Culture and Tourism. ■ Ministry of Transport and Communications. ■ Ministry of Labour, Employment and Social Security. ■ National Agency for Environment Quality Control (AQUA). ■ National Directorate of Environment (DINAB). ■ National Directorate of Territorial Planning and

Category	Sub-category	Description
		<p>Resettlement.</p> <ul style="list-style-type: none"> ■ National Directorate of Agrarian Services. ■ National Directorate of Land and Forestry. ■ National Directorate for Conservation Areas. ■ National Directorate of Geology. ■ National Institute of Geology and Mines. ■ National Institute for Disaster Management.
	Inhambane Provincial Government	<ul style="list-style-type: none"> ■ Office of the Provincial Governor. ■ Provincial Directorate of Land, Environment and Rural Development. ■ Provincial Directorate of Mineral Resources and Energy. ■ Provincial Directorate of Public Works, Housing and Water Resources. ■ Provincial Directorate of Agriculture and Food Security. ■ Provincial Directorate of Fisheries. ■ Provincial Directorate of Sea, Inland Waters and Fisheries. ■ Fisheries Research Institute- Provincial Delegation. ■ Provincial Directorate of Industry and Commerce. ■ Provincial Directorate of Labour, Job and Social Safe. ■ Provincial Directorate of Transport and Communications. ■ Provincial Directorate of Women and Social Action. ■ Provincial Directorate of Health. ■ Provincial Directorate of Tourism. ■ Maritime Administration.
	District Level Government	<ul style="list-style-type: none"> ■ Inhassoro District Administrator. ■ District Permanent Secretary. ■ District Command of Policy (PRM). ■ District Services of Economic Activities. ■ District Services of Education, Youth and Technology.

Category	Sub-category	Description
		<ul style="list-style-type: none"> ■ District Services of Health, Woman and Social Affair. ■ District Services of Planning and Infrastructures. ■ Administrative Post of Bazaruto. ■ Administrative Post of Inhassoro. ■ Administrative Post of Vilanculos. ■ Maritime Administration from Vilanculos.
Interest group	Public, private companies, agencies, and financial institutions (national & provincial level)	<ul style="list-style-type: none"> ■ ENH. ■ ENH Logistics. ■ Petromoc. ■ Matola Gas Company. ■ World Bank. ■ IFC. ■ EDM. ■ National Road Administration (ANE). ■ ARA-Sul. ■ Beira Port companies Authority (e.g. Beira).
	Environmental Interest Groups	<ul style="list-style-type: none"> ■ IUCN. ■ FNP - Forum for Nature in Danger. ■ WWF Mozambique. ■ EWT (Endangered Wildlife Trust). ■ National Administration of Conservation Areas (ANAC). ■ Centro Terra Viva. ■ African Parks.
Locally affected people	Local leaders	<ul style="list-style-type: none"> ■ Village leaders appointed by the government. ■ Traditional authorities, chiefs and leaders. ■ Religious or educational leaders. ■ Igreja Metodista Unida de Moçambique. ■ Influential people.

Category	Sub-category	Description
	Affected individuals	Men, women, children, youth, elderly, and disabled living in the project areas.
	Local institutions and service providers in the Project Area of Influence	Educational and health services.
	Local business/companies	<ul style="list-style-type: none"> ■ Business owners (onshore, offshore and from Bazaruto Archipelago). ■ Fisheries Association: Inhassoro and Vilanculos.
NGOs	Local NGOs, conservation entities and civil society organisations	<ul style="list-style-type: none"> ■ Livaningo. ■ AMAVIL (Associação dos Amigos de Vilanculos). ■ Forum Turismo de Vilanculos. ■ Plataforma dos Recursos Naturais e Indústria Extractiva. ■ Associação para Investigação Costeira e Marinha. ■ Associação Tomba Yedo (Ilha de Bazaruto).
	Community-based organisations	Local organisations representing key interest groups within the community.

3.2.3 Recruitment policy and workforce management

The client's approach to recruiting the labour force may be one of the most effective techniques to mitigate and manage potential in-migration into the project area. The strategies to manage in-migration through recruitment planning includes:

- Prioritising the recruitment of locally affected people;

The client should first consider locals when recruiting employees, consequently, this may reduce the influx of people into the project area in search of work opportunities. The local recruitment policy should be carefully developed by the client with relevant stakeholders such as the local traditional authorities and government officials before the commencement of project activities. The local recruitment policy should be extended to the procurement of goods and service.³

- Provision of worker transport for locals; and

The client should consider the provision of transportation services for the local project workforce living within a 50-100 km radius. This service may reduce the impetus for migration towards the project site,

³ Note: Due to the newness of the joint venture, these policies still have to be developed.

demand for local housing, pressure on local infrastructure, services, and utilities, and thus pre-empt the development of larger population centres close to the project site.

- Provision of housing and provision of basic services within the work camp.

It is anticipated that the local labour force will not have all the skills which will be required by the client. As a result, the client is expected to appoint in-migrants from other districts, provinces, or countries. The provision of accommodation and basic services viz., food, water, and sanitation within the work camp for in-migrant employees will minimise their interactions with the locals, consequently reducing competition for resources and the spread of diseases. The client should consider implementing a strict behaviour control aimed at observing and managing project personnel in their day to day interactions with local communities. Such control mechanisms may be especially important over weekends and over pay periods when workers typically engage in consuming alcohol and transactional sex activities with locals. Educational awareness programmes and other measures should be employed to highlight the risks of such behaviours as well as to reduce the occurrences of sexual exploitation and abuse and gender-based violence, particularly as it affects women, youth, children. Other behaviour control initiatives which should be considered by the client include transportation to urban areas for recreation and co-ordinating sports events for workers.

3.2.4 Spatial planning, administration, and resource allocation

To avoid unplanned settlement expansion aimed at accommodating the demand of housing facilities from in-migrants, the client should work closely with local traditional authorities and government. Additionally, the client should work with local authorities to determine buffer zones around camps and infrastructure where settlement will be controlled, and in-migrants directed to areas zoned to manage migrants. In this way, better management in the development of infrastructure, services, and utilities will be enhanced.

3.2.5 Promotion of regional diversified growth strategies

The client should consider supporting the development and implementation of regional growth strategies that create alternative economic opportunities, distant from the direct project area of influence. Additionally, the client should consider training opportunities for locals to capacitate them with other skills to secure semi-skilled or skilled job opportunities. Such support could ensure that the project does not become the sole focus of economic development and attraction. Collaboration with a wide range of stakeholders will assist in developing diversified regional growth strategies.

3.2.6 Implementation of health and safety education programmes

The client should consider collaborating respectively, with health officials, traffic, and police institutions to educate community members and leaders on the following aspects:

- The spread and prevention of infectious diseases such as HIV/AIDS.
- Ensuring road safety.
- The mitigation and reporting of crimes.
- The prevention and response to sexual exploitation and abuse and gender-based violence.

4.0 IN-MIGRATION MONITORING AND EVALUATION SYSTEM

The development and implementation of a rigorous and regular monitoring and evaluation framework should be considered by the client. The main purpose of this framework will be to track progress and identify issues related to the rate, scale, and social characteristics of project-induced in-migration. The main objectives of monitoring and evaluating the management of in-migration include:

- To promote coordination;
- Identify successful interventions for replication in the future;
- Identify unsuccessful interventions to avoid in the future; and
- Obtain periodic data for further planning.

The client should consider conducting the following activities during the monitoring process:

- The analysis of available aerial and satellite imagery to assess the expansion of settlements within the project area;
- Focus group discussions with local authorities and traditional leaders facilitated by a trained facilitator using a semi-structured focus group discussion guide. The purpose of the discussions will be to determine the changing perceptions of migration patterns; and
- Household survey of all settlements that have been identified as potential in-migration hotspots, for instance, Mangungumete and Maimelane; and any other communities near the project area.

After each monitoring activity, the client will have to develop monitoring systems, these are shown in Table 5.

Table 5: In-migration monitoring systems

System	Description
In-migration database	This database should be used by the client to track the results of the in-migration monitoring which includes aerial/ satellite imagery, focus group discussions with local authorities and traditional leaders and household survey results.
Stakeholder engagement database	The stakeholder engagement dataset will be used to track and record the following: <ul style="list-style-type: none"> ■ List of stakeholders; ■ Contact details of stakeholders; and ■ Dates, minutes, and attendance of engagement activities.
Community feedback and grievance mechanism	All grievances, issues and concerns raised during the engagement will be recorded on this system. Additionally, the system will also record details on the following: <ul style="list-style-type: none"> ■ Measures to address issues; ■ Timeframes for addressing issues; ■ Personnel responsible for addressing issues; and ■ Any subsequent feedback that is required.
Worker transport management	This system should be aimed at ensuring the relevant people board the bus. This aspect can be monitored by using access cards when boarding the bus.

Additionally, the client should consider developing a monitoring and evaluation matrix which can be used as a tool for showing how each indicator is linked to the achievement of the stated goals and objectives. The main columns in the matrix should include the following aspects:

- Source, potential and category of impact;
- Mitigation and management approaches;
- Monitoring indicator;
- Monitoring frequency;
- Stakeholders responsible for the management and monitoring of impacts; and
- Financial implications of management, monitoring, and evaluation measures.

5.0 CONCLUSION

Golder has prepared this influx management framework for the client guided by the IFC's handbook for addressing project-induced in-migration. Golder recommends the following for the client:

- The client should develop and implement a comprehensive Influx Management Plan;
- The client should organise stakeholders into a formal committee that sits on a regular basis to address the integrated aspects of managing in-migration; and
- The client should design and implement an in-migration management and monitoring reporting platform. This platform should include, but not to be limited to:
 - Internal reporting;
 - Internal in-migration management and monitoring reports should be published at least annually; and
 - Community reporting.

The client should summarise their internal reports into simple reports which are suitable for digestion by a non-technical audience. These reports should be disclosed to the community on an annual basis.

6.0 REFERENCES

- 1) Golder Associates, 2018. Socio-economic baseline-Central Térmica de Temane Project.
- 2) Golder Associates, 2018. Stakeholder Engagement Plan-Central Térmica de Temane Project.
- 3) IFC, 2009. *Projects and People: A Handbook for Addressing Project-Induced In-migration*. www.ifc.org
- 4) IFC, 2007. *Stakeholder Engagement - A Good Practice Handbook for Companies Doing Business in Emerging Markets*.

Signature Page

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