

**1. Annex to the EIA report, the assessment under Art. 99a, para. 1 of the EPA – assessment on application of BAT**

It is presented in a separate document - BAT CS Chiren.

**2. Design options have been developed for the IP. In the EIA Report, the design options proposed by the Contracting authority are described and equally evaluated.**

2. Alternatives for implementation of the investment proposal

According to Bulgarian and European legislation, the environmental impact assessment procedure requires consideration of the location alternatives and/or technology alternatives studied by the contracting authority and the reasons for the selection made for the study, taking into account the environmental impact, including the "zero alternative".

Assessment of the particular alternatives related to implementation of the investment proposal, which are described below in the EIAR, will be based on the studies carried out by the Contracting authority. Since the assessment of possible alternative solutions is not an exact discipline, in the process of their comparison it is not always possible to apply a universal approach with the same criteria. It relies on both, rigorous scientific studies and best practice studies, observations or subjective professional opinion of the relevant expert or third parties. Based on this, the possible alternative solutions will be described, compared and evaluated below, including in terms of environmental impact, taking into account the advantages, disadvantages and equivalence of each of them.

In equal consideration of the possible alternatives/options, with the relevant criteria for each of them, the following matrix shall be applied:

Degree of impact Environmental component or factor	Degree of preference of an alternative/option $\Sigma$	Advantage of an alternative/option $\Sigma +/-/0$		
		advantage/ rather advantage (+)	disadvantage/ rather disadvantage (-)	equality (0)
positive/rather positive (+)	preferred/rather preferred ( $\Sigma+>\Sigma-$ )			
negative/rather negative (-)	unpreferred/rather unpreferred ( $\Sigma+ <\Sigma-$ )			
no impact is expected/ negligible impact (0)	equality ( $\Sigma 0 = \Sigma+ = \Sigma-$ )			

Based on this, the preferred alternative/option for implementation of the investment proposal will be identified, for which a detailed assessment of the specific impacts will be made in the following sections of the EIAR, applying the methodology for assessing the impacts on environmental components and factors detailed in item 0

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## 2.1. Zero alternative

Applying zero alternative, i.e. if the envisaged investment proposal is not implemented, shall result in missed economic benefits for the Contracting authority, as well as social and financial negatives for the workers, local population, municipalities and the region as a whole. Last but not least, non-implementation of the IP will have a negative impact on the national level as well by prevention of UGS capacity increase, which in turn may have a negative effect on economy and population.

The investment proposal does not contradict national legislation, therefore there is no reason to apply a zero alternative.

## 2.2. Other alternatives

### 2.2.1. In terms of location

The new site must also comply with the following requirements:

Have minimal impact on environment;

Avoid protected areas, Natura 2000 sites and natural sites;

Be remote from settlements, civil and special sites and their adjacent infrastructure, mining and underground exploitation, quarries, explored and concession areas of mineral resources, etc.;

Be distant from areas of archaeological importance;

Not to be in forestry and rocky areas, irrigating, drainage fields, water catchment areas, landslide areas, geologically unstable terrains, areas with pronounced erosion, etc., risk areas;

To be located in a feasible location from an engineering point of view, in accordance with environmental legislation;

Have, as far as practicable, a minimum impact on agriculture;

Implies minimal risk to the security of the compressor station and settlements;

On this basis, the designated new site is located more than 1.2 km from the construction boundaries of Chiren village, in close proximity, to the southwest of the existing one, and all the required new process equipment will be located therein.

In view of the above, no other alternatives have been considered with regard to the location of the new Chiren UGS site.

### 2.2.2. In terms of technology

The concept of a centrifugal compressor driven by a gas turbine engine (GTE) has been used for implementation of Chiren UGS expansion.

Based on the comparative analysis of the different possible concepts, Option V (ESA) and Option VI (BCA) were rejected in terms of feasibility. Therefore, a comparison of the

alternatives in terms of the technical and economic indicators on the number of GTCUs, regarding the capacity of facilities will only be made for the GTCU concept - Option I, Option II, Option III and Option IV.

### 2.2.3. Facilities' capacity alternative

In order to develop a workable optimal option for UGS operation, a detailed study of the geological structure was carried out to determine its hydrodynamic regime and four main option solutions (alternatives) of operating modes at different formation pressures and flow rates were considered to maximize the operating volume and maximum daily withdrawal:

Option I with formation pressure 116 barg, gas flow 4,400,000 m<sup>3</sup>/day-1 (183,333 m<sup>3</sup>/ hour-1)

Option II with formation pressure 130 barg, gas flow 8 000 000 m<sup>3</sup>/day-1 (333,333 m<sup>3</sup>/ hour-1)

Option III with formation pressure 150 barg, gas flow 10 000 000 m<sup>3</sup>/day-1 (416,660 m<sup>3</sup>/ hour-1)

Option IV with formation pressure 180 barg, gas flow 12 000 000 m<sup>3</sup>/day-1 (500, 000 m<sup>3</sup>/ hour-1)

On the basis of the comparative analysis carried out in item 2.2.3 of the EIAR of the different possible options for the capacity of the UGS facilities, Option I, Option II and Option IV are rejected in terms of feasibility. Therefore, a comparison of the alternatives in terms of technological and economic indicators regarding the number of GTCUs will be made for Option III only.

In view of the above, this EIAR will consider and assess the potential impacts on environmental components and factors for Option III.

### 2.2.4. In terms of the technical and economic indicators of the number of GTCUs

Based on the comparative analysis in item 2.2.3 justifying the preferred capacity of the UGS facilities for the new compressor station, item 2.2.4 of the EIAR compares the technical and economic indicators of the alternative solutions (sub-options) of Option III on the number of GTCUs - 2+1 or 3+1.

Based on comparison of the advantages and disadvantages of configuration of the number of GTCUs (Option III A: 2+1 or Option III B: 3+1, as the best option and preferred for application in the project is Option III C: 3+1 – GTCU.

### 2.3. Selection of option taking into account the effects of the environmental impacts of the IP

Based on equitable consideration of the possible alternatives/options, the best option, preferred for implementation is Option III C: 3+1 - GTCU, planned to be implemented at a new technological site adjacent to the existing one at Chiren UGS, for which a detailed assessment of the specific impacts will be carried out in the following sections of the EIAR, applying the Methodology for assessment of the impacts on environmental components and factors detailed in item 4.1.

## **3. Annex 1 and Annex 2 of the EIAR**

Appendix 1 – Region situation

## Appendix 2 - General plan

### **4. Item 1.3.3.2 of the EIAR**

#### 1.3.3.2. Gas pipeline branches, pipelines and gatherings to CS Chiren UGS

The following gas pipeline branches, pipelines and gatherings will be designed in the lands of the village of Chiren:

A gas pipeline branch connecting the existing gas pipeline Vratsa 1 to the newly designed Compressor station with a length of about 266 m and a diameter of DN 500 mm;

A gas pipeline branch connecting the existing gas pipeline Vratsa 2 to the newly designed Compressor station with a length of 35 m and a diameter of DN 500 mm;

Gas pipeline connection between the new site and the site of the new flare with a length of 111 m, consisting of pipelines for - fuel gas (DN25), instrumentation air (DN25), natural gas released from the facilities with a diameter of DN250;

Gatherings (28 gatherings) connecting the site of the CS to the existing ones of the exploitation wells with lengths varying from 400 – 500 m and a diameter of DN 150 mm;

Displacement of the route of an existing gas gathering to Well 28, running through the territory of the new technological site to the CS with a length of 620 m and a diameter DN 150 mm;

Displacement of the route of an existing gas gathering to Well 23, running through the territory of the new technological site to the CS with a length of 180 m and a diameter DN 150 mm;

Displacement of the route of an existing gas pipeline Nivego with a length of about 840 m and diameter DN 50 mm, owned by Nivego OOD;

Drainage condensate pipeline with a length of about 845m and a diameter of DN 100 mm between the new site and the fiscal warehouse located in land property with identifier 81400.37.179;

Formation water pipeline with lengths of about 350 m and DN 100 mm, which will exit the new site to the existing one of Chiren UGS.

According to pipes' diameter and Ordinance No. 16 of 09.06.2004 for the easements of energy sites, a 30 m easement zone is set up, 15 m each on both sides of the newly designed gas pipeline branches for connection with gas pipelines Vratsa 1 and Vratsa 2 and flare system. Gas pipelines for condensate and formation water fall within the existing easement of the well gatherings. The new connections to the wells (gas gatherings) will be located in parallel and an easement zone with a width of 5 m parallel to the axis of the final gas pipelines will be established for them (gatherings). For the displaced routes of the gatherings to Wells 23 and 28 and the displaced route of the Nivego gas pipeline an easement will be established of 12 m, 6 m on both sides of the axis.

The pipelines and gas gatherings will be laid underground at a depth of min 1.0 m, measured from the upper part of the pipe according to the requirements of the Ordinance on the design and safe operation of transmission and distribution gas pipelines and on the facilities, installations and equipment for natural gas.

In this zone the following are not allowed: any type of construction, soil cultivation (plowing) of the soil at a depth greater than 0.5m, as well as lighting a fire, planting perennial tree

plantations, carrying out drilling works, exploration and production of underground natural resources, parking of all types of vehicles, storage of waste and materials, actions of third parties on facilities of the energy sites, etc.

#### **5. item 1.3.4. of EIAR.**

1.3.4. Necessary areas (such as developed land, agricultural land, forest areas, etc.) during the construction phase and the operation phase

Expansion of Chiren UGS site

During the construction and operation phase, the investment proposal will cover an area of 82.24 dka with the main use according to Art. 7 of the SDA - agricultural area. The properties on which the compressor station will be constructed fall on the land of Chiren village with EKATTE 81400, Vratsa Municipality, Vratsa district.

The affected areas in terms of permanent use are - (corn)field (21,129 dka); grassland (4,482 dka); vineyard (56,633 dka).

Easement of gas pipeline branches, pipelines and gatherings to Chiren UGS

A gas pipeline branch connecting the existing gas pipeline Vratsa 1 to the newly designed CS with a length of about 266 m and a diameter of DN 500 mm;

During the construction and installation phase, the gas pipeline branch will affect an agricultural area of 4.717 dka and a transport area of 0.303 dka. The affected areas in terms of permanent use are - (corn)field (4,717 dka); for local road (0,303 dka).

An easement area will be established for the facility during operation.

A gas pipeline branch connecting the existing gas pipeline Vratsa 2 to the newly designed CS with a length of 35 m and a diameter of DN 500 mm;

During the construction and installation phase, the gas pipeline branch will affect an agricultural area of 0.327 dka. The affected areas in terms of permanent use are - for gas pipeline facilities (0.243 dka); vineyard (0.084 dka).

The operation of the facility will take place in an existing easement area.

Gas pipeline connection between the new site and the site of the new Flare of 111 m length;

During the construction and installation phase, the gas pipeline connection will affect an agricultural area of 2.145 dka. The affected territories in terms of permanent use are - (corn)field (1,495 dka); vineyard (0.517 dka); pasture (0.034 dka), for agricultural forestry and service road (0.099 dka).

An easement area will be established for the facility during operation.

Gatherings (28 gatherings) connecting the site of the CS to the existing ones of the exploitation wells with lengths varying from 400 – 500 m and a diameter of DN 150 mm;

During the construction and installation phase, the gatherings will affect an agricultural area of 6.76 dka. The affected areas in terms of permanent use are - (corn)field (6,608 dka) and for agricultural forestry and service road (0.152 dka).

An easement area will be established for the facility during operation.

Displacement of the route of an existing gas gathering to Well 28, running through the territory of the new technological site to the CS with a length of 620 m and a diameter DN 150 mm;

During the construction and installation phase, the gathering will affect an agricultural area of 4.868 dka. The affected areas in terms of permanent use are - vineyard (4.868 dka).

An easement area will be established for the facility during operation.

Displacement of the route of an existing gas gathering to Well 23, running through the territory of the new technological site to the CS with a length of 180 m and a diameter DN 150 mm;

During the construction and installation phase, the gathering will affect an agricultural area of 0.997 dka. The affected areas in terms of permanent use are - (corn)field (0,194 dka); vineyard (0,090 dka).

An easement area will be established for the facility during operation.

Displacement of the route of an existing gas pipeline Nivego with a length of about 840 m and diameter DN 50 mm, owned by Nivego OOD;

During the construction and installation phase, the gas pipeline will affect an agricultural area of 6.632 dka. The affected areas in terms of permanent use are - vineyard (6.632 dka).

An easement area will be established for the facility during operation.

Drainage condensate pipeline with a length of about 845m and a diameter of DN 100 mm between the new site and the fiscal warehouse located in land property with identifier 81400.37.179;

During the construction and operation phase, most of the pipeline falls within an existing easement and the easement of the new 28 gatherings to the wells. For the rest, a new easement with an area of about 1.1 dka shall be established. The affected areas in terms of permanent use are – transport territories (0.3 dka) and agricultural area (0.8 dka).

Formation water pipeline of about 350 m length and DN 100 mm, which will exit the new site to the existing one of Chiren UGS.

During the construction and operation phase, the pipeline falls within an existing easement and the easement of the new 28 gatherings to the wells.

Newly designed road connections to Chiren UGS site

During the construction and operation phase, the road connections will cover an area of 1.79 dka with main use - agricultural area. The affected properties fall within the lands of the village of Chiren, Vratsa Municipality, Vratsa district.

The affected areas in terms of permanent use are - (corn)field (1,79dka).

Water pipeline to the newly designed site of Chiren UGS

During the construction and installation phase, the water pipeline supplying the new site affects an agricultural area of 0.178 dka and an urbanized area of 0.031 dka. The affected areas in terms of permanent use are - (corn)field ((0.178dka); for another type of production, storage facility (0.031 dka).

An easement area will be established for the facility during operation.

### Newly designed rainwater drainage

During the phase of construction and installation works, the drainage affects an agricultural area of 0.205 dka and an urbanized territory – 0.024 dka. The affected areas in terms of permanent use are - corn(field) (0,205 dka); for other type of production, storage site (0,024 dka).

An easement area will be established for the facility during operation.

### Technological site for flare system

During the construction and operation phase, the site will cover an area of 12.855 dka of main use - agricultural area, in terms of permanent use - corn(field).

### Anode grounding devices

During the construction and installation phase, the routes for the anode grounding devices affect an agricultural area of 1,079 dka. The affected areas in terms of permanent use are - (corn)field (0,072 dka) and for agricultural forestry and service road (0.026 dka) and pasture (0,006 dka).

An easement area will be established for the facility during operation.

More detailed information on the balance of the territory affected by the easements of the newly designed sites of the IP is provided in Appendix 9.

### Temporary construction site (Temporary settlement)

A site for temporary construction (temporary settlement) of about 3 dka area is envisaged. It will be located within the site of the compressor station, adjacent to the newly installed GTCUs immediately next to the newly built access road to the site.

The activities on the temporary construction site are illustrated by allocation of the following zones according to their designation:

Zone "A" - Site management - offices, meeting room.

The following container offices will be deployed:

2 container offices 6.0/2.4 m; 28.8 m<sup>2</sup> for the contracting authority;

1 container office 6,0/2,4m; 14,4 m<sup>2</sup> for the designer;

2 container offices 6.0/2.4 m; 14.4 m<sup>2</sup> for independent construction supervision;

6 container offices 6.0/2.4 m; 86.4 m<sup>2</sup> for independent construction supervision;

1 container officer 6.0/2.4 m; 14.4 m<sup>2</sup> for equipment suppliers;

1 container office 6,0/2,4m; 14,4 m<sup>2</sup> for subcontractors;

1 container office 6,0/2,4m; 14,4 m<sup>2</sup> for NDT of welds;

1 container office 6,0/4,8m; 28,8 m<sup>2</sup> for a meeting room;

1 container office 3,0/2,4 m; 7,2 m<sup>2</sup> with toilets - chemical.

Zone "B" - Workers' settlement

10 container offices 6,0/2,4m /144 m<sup>2</sup>/ changing rooms for workers;

Container office type T-4 - 4,0/2,4m/ 9,6 m<sup>2</sup>/ with toilets - chemical.

Zone "C" - Warehouses.

Storage of construction materials, machinery, equipment and tools. For this purpose, the following will be identified and provided for:

2 container offices 6.0/2.4 m; 28.8 m<sup>2</sup> – indoor warehouse for materials and equipment for Electrical and CS Automation;

Open area 13/15 m/195 m<sup>2</sup>, for large-sized materials. The site will be covered with coarse gravel;

Open site 10/15 m/150 m<sup>2</sup>, for containers with equipment for site assembly. A concrete pavement is provided for (ready-made panels - easily moved);

Open site 20/20 m/400 m<sup>2</sup>, for on-site assembly of structures and equipment. Concrete pavement (reinforced concrete panels) is envisaged;

Container office type T-4 - 4,0/2,4m/ 9,6 m<sup>2</sup>/ with toilets - chemical.

Zone "C" - Security

1 security cabin 1,4/2,0 /2,8 m<sup>2</sup>.

Household waste containers will also be located on site.

The maximum number of workers on the construction site will be around 150, and they will not spend the night in the temporary settlement, but will only stay during the working day.

The site will be powered by diesel generators. Temporary lighting will be installed.

Temporary water supply shall be provided for duration the construction period. In order to supply the necessary water quantities, the water supply network of the existing site of Chiren UGS will be used, where water for domestic and potable needs is supplied by the local Water and Sewerage Company. Waste water will be collected in a tank and a contract will be concluded with a relevant company for its cleaning. The contractor will supply bottled potable water to the CIW contractors.

According to the current General Spatial Plan of the Municipality of Vratsa, the site of the IP and the areas of the accompanying infrastructure sites fall into a spatial zone for uncultivated land with a prohibition on land use change. The implementation of the IP is possible, taking into account the requirements of Art. 59 and Art. 109, para. 3, item 1 of the General Spatial Plan, as well as the fact that by decision of the Council of Ministers No. 755 of 21.09. 2004, Chiren UGS was declared a site of national importance in the sense of §5, item 62 of the Additional Provisions of the Spatial Development Act and a strategic site of national importance in the energy sector pursuant Article 4, paragraph 2, item 3 of the Energy Act. The relevant marking of the newly designed site following its construction, as well as the undertaking of necessary amendments of the General Spatial Plan, in the event of such a need, will be undertaken and carried out in accordance with the General Spatial Plan and its by-laws. Reference of Chiren UGS location, in particular the planned expansion of the above-ground part, in relation to the provisions of the General Spatial Plan of the municipality of Vratsa, is presented in Appendix 7 to this EIA Report.



## 6. Table 8, item of the EIA Report.

### 1.5.1.1. During construction

Construction, hazardous and domestic waste will be generated during construction. Maintenance of construction equipment and machinery, when necessary, is planned to be carried out in garages, not on the territory of the construction site.

Construction works that will generate waste at the CS site and its infrastructure connections are generally:

*Excavation works on the technological site, along the trench of the gas pipeline branches, pipelines and gatherings, and on the construction of the water pipeline and sewerage; Construction and installation works within the scope of the entire IP; Domestic activities of workers.*

The following waste is expected to be generated as classified according to Ordinance 2/23.07.2014 on waste classification, presented in Table 8 below.

Table 8 Waste expected to be generated during construction

Waste Group/Code	Type of waste	Quantity, t/m <sup>3</sup>
12 01 Wastes from moulding, physical and mechanical surface treatment of metals and plastics		
12 01 13	Welding waste	0.15
12 01 21	Spent grinding bodies and grinding materials, other than those mentioned in 12 01 20*	0.03
15 01 Packaging (including separately collected household waste packaging)		
15 01 01	Paper and cardboard packaging	0.6
15 01 02	Plastic packaging	0.5
15 01 03	Wood packaging	0.9
15 01 04	Metal packaging	0.6
15 01 06	Mixed packaging	0.5
15 01 07	Glass packaging	0.3
15 01 10*	Packaging containing residues of hazardous substances or contaminated with hazardous substances	0.6
15 02 Absorbents, filter materials, wipes and protective clothing		
15 02 02*	Absorbents, filter materials (including oil filters not specified elsewhere), wiping cloths and protective clothing contaminated with hazardous substances (oils)	Under 1.0
15 02 03	Absorbents, filter materials, wipes and protective clothing other than those mentioned in 15 02 02	Under 1.0
17 01 Concrete, bricks, roof tiles, tiles, porcelain and ceramic products		
17 01 01	Concrete	5.0

Waste Group/Code	Type of waste	Quantity, t/m <sup>3</sup>
17 01 07	Mixtures of concrete, bricks, roof tiles, tiles, faience and ceramic products other than those mentioned in 17 01 06	1.7
17 02 Wood, glass and plastic		
17 02 01	Wood material	5.5
17 02 03	Plastic	0.8
17 04 Metals (including their alloys)		
17 04 05	Cast iron and steel	4.0
17 05 Soil (including excavated soil from contaminated places), stones and excavated earth masses		
17 05 04	Soil and stones other than those mentioned in 17 05 03	8000 m <sup>3</sup>
17 06 Insulating materials and asbestos-containing construction materials		
17 06 04	Insulating materials other than those mentioned in 170601 and 170603	0.3
17 09 Other construction and demolition waste		
17 09 04	<i>Mixed construction and demolition waste, other than those mentioned in 17 09 01, 17 09 02 and 17 09 03</i>	1.0
20 03 01 - Other household waste		
20 03 01	Mixed household waste	3.5

Treatment of waste generated during construction works will be carried out according to the legislation in force in the country - the Waste Management Act and the regulations thereto.

Construction waste - in accordance with the requirements of the Waste Management Act and the Ordinance on construction waste management and use of recycled construction materials together with the preparation of the technical design, a construction waste management plan will be prepared and agreed with the responsible authorities. This waste will be temporarily stored in designated areas on the construction site of Chiren UGS expansion.

*Concrete with code 17 01 01 - will be collected in a metal, open container with a volume of 4 m<sup>3</sup>.*

*Mixtures of concrete, bricks, tiles, faience and ceramic products, other than those mentioned in 17 01 06 with code 17 01 07 and waste with code 17 09 04 mixed construction waste - will be collected in a metal, open container with a volume of 4 m<sup>3</sup>. Wood with code 17 02 01 - will be collected in a specially designated place on the construction site, outdoors.*

*Plastic with code 17 02 03 - will be collected in a container.*

*Cast iron and steel with code 17 04 05 - will be collected in a container.*

*Waste with code 17 05 04 from site expansion will be removed to a depot near the construction site and agreed with the municipal administration. The resulting soil and*

stones from the excavations of the trenches for construction of the gas pipeline branches, pipelines and gatherings, as well as on construction of the water pipeline and sewerage, will be temporarily stored parallel to the excavation in the construction strip/easement. After laying the pipelines, backfilling will be carried out, which will be part of the technical revegetation, and excess earth masses, soils and stones will also be transported to a landfill.

Insulation materials other than those mentioned under code 17 06 04 - this type of waste will be generated from the use of polyurethane foam for insulation of pipes and other equipment and will be stored in a container.

Concerning all non-hazardous waste, prior to the start of construction works, sites will be set aside for separate collection and handing over to companies that have the necessary registration documents for subsequent treatment according to the order of the Waste Management Act, located on the territory of the extension of the storage facility. This includes the following types of waste, as well as packaging waste:

*Welding waste with code 12 01 13 and spent grinding bodies and grinding materials with code 12 01 21 (waste from welding and grinding of gas pipelines and gatherings and from CIW at the CS) - will be collected in a container and handed over for recycling.*

*Absorbents, filter materials, wiping cloths and protective clothing with code 15 02 03 (generation of used foam pads for drying of the gatherings and gas pipelines as a result of the hydrotest) - will be collected at a designated site and handed over for recycling.*

*Packaging (including separately collected household waste packaging):*

- *paper and cardboard packaging with code 15 01 01 and plastic packaging (packaging of materials and equipment) with code 15 01 02 will be collected in a closable container and handed over for recycling.*
- *packaging of wood materials with code 15 01 03 (equipment packaging) - will be collected at a specially designated place on site and handed over for recycling.*
- *metal packaging with code 15 01 04, mixed packaging with code 15 01 06 (packaging of materials and equipment) and glass packaging with code 15 01 07 - will be collected in a container and handed over for recycling.*

Hazardous waste is planned to be stored on specially marked sites with a concrete or impervious base and handed over for subsequent treatment to companies holding the necessary permits under Art. 35 of the Waste Management Act and/or registration document, based on a signed contract. They will be generated during operation of equipment, use of various raw materials and in performance of construction and installation works and include:

*Packaging containing residues of hazardous substances or contaminated with hazardous substances with code 15 01 10\* - will be collected in a marked, metal, closed container and handed over for reuse (recycling) or disposal.*

*Wipes and protective clothing contaminated with hazardous substances (15 02 02\*) - will be generated when cleaning the used construction and assembly and transport equipment and from contamination of work clothing.*

Municipal waste will be generated by the workers engaged in the construction works. Municipal waste with code 20 03 01 mixed municipal waste will be generated and collected mainly by those working on the construction site. Mixed municipal waste will be collected in containers and handed over to an external company for landfilling.

## **7. Section 1.5.3.3.1 of the EIAR section 1.5.3.3.2 of the EIAR.**

### **1.5.3.3.1. During construction**

Estimates of gaseous and dust emissions during construction are based on the following activities:

- Clearing, digging, bulldozing, levelling and excavation works;
- Dust material handling - loading and unloading of earth materials;
- Dust generation from wind erosion at open dust areas (heap disposal area/dumping ground);
- ICE of construction machinery;
- Transportation scheme for earth material removal and delivery of raw materials and supplies.

The emissions inventory provides an estimate of both pollution levels and identifies the type of pollution sources. In this case, the construction site during construction works is defined as a area source and line from the transport scheme. All of these are diffuse emission sources.

Dust emissions from a point (area) source

The quantities of humus and rock masses for shaping the new site of Chiren UGS are shown in the following table.

Table 11 Balance of earth masses

Soil type	Humus /0.50/		Earth mass		
	<b>m<sup>3</sup></b>				
Activity: Equipment:	cleaning	vertical layout	excavation	backfill	further quantities
Gas gatherings	36,550		26,697	26,233	235
Water pipeline	250		215	104	22
Sewerage	265		427	196	84
Anode earthing devices (AED)	671		219	192	27
Road/off site/	700		65	340	1,250
A platform under the compressors and buildings	33,225	32,944	13,550	6,950	5,700
Flare	5,000		5,000	5,000	
<b>TOTAL</b>	<b>109,605</b>		<b>92,504</b>		

According to data of Table 11, assessment of areal dust emissions was made (Table 12) - total dust, fine particulate matter (PM) up to 10 and up to 2.5 microns based on emission factors of the US Environmental Protection Agency (EPA) for operation in open dusty areas:

Construction and Aggregate Processing and Fugitive Dust Open Sources - US EPA, Emission factors<sup>1</sup> during construction at Chiren UGS.

Table 12 Dust emissions during construction (tons)

Activities	Emissions, t		
	Dust	PM <sub>10</sub>	PM <sub>2.5</sub>
Bulldozing	32.48	15.80	4.83
Handling of bulk materials (removal and loading)	7.28	3.54	1.08
Movement of the dump trucks to heap disposal area/dumping ground	5.70	1.74	0.25
Wind erosion	10.98	5.50	2.20
TOTAL	<b>56.43</b>	<b>26.58</b>	<b>8.36</b>

Gaseous emissions from a point (area) source

These emissions come from the diesel engines with internal combustion of the equipment used for CIW

Table 5 Construction machinery with diesel engines

The estimate of emissions of harmful substances in the exhaust gases from liquefied natural gas of construction equipment is based on the methodology EMEP/EEA air pollutant emission inventory guidebook, 2019, NFR code 1.A.2.g vii - Off-road equipment and machinery with diesel internal combustion engines, and for carbon dioxide - according to 2006 IPCC Guidelines for National Greenhouse Gas Inventories.

Table 13 Emissions from an area source (construction machinery)

Greenhouse gases			Major and specific pollutants					
t/km								
CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	NO <sub>x</sub>	SO <sub>2</sub>	CO	NMVOC	PM <sub>10</sub> *	NH <sub>3</sub>
849.40	0.052	0.363	3.76	0.027	5.19	0.6	0.26	0.002

\* Solid particulate matter (PM) consists primarily of soot (carbon) and ash from the combustion of fuel additives (diesel) and oils.

The above amounts of emissions are released directly into the ambient air from the exhausts of construction machinery with internal combustion engine (ICE) Amount of greenhouse gases in tons of CO<sub>2</sub>-eq. is 958.1 t during construction.

Gaseous emissions from a linear source (transport scheme during construction)

1 <http://www.epa.gov/ttn/chief/ap42/index.html>

The estimate of ICE emissions in the municipal road transport scheme VRC1036 (Table 18 ) was made according to the methodology EMEP/EEA air pollutant emission inventory guidebook, 2019, NFR<sup>2</sup> code 1.A.3.b.iii. 2006 IPCC - Guidelines for National Greenhouse Gas Inventories methodology was used to determine sulphur oxides and carbon dioxide.

The emission quantities are defined for:

- Ozone precursors – CO, NOX, NMVOC (non-methane volatile compounds);
- Greenhouse gases (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O);
- Acidifying substances (NH<sub>3</sub>, NOX, SO<sub>2</sub>);
- Fine particulate matter (PM);
- Carcinogenic compounds;
- Heavy metals.

Fuel evaporative emissions are not included (NFR Code 1.A.3.b.v), but particulate emissions from tire and brake wear (NFR Code 1.A.3.b.vi) and road surface wear (NFR Code 1.A.3.b.vii) are included.

Table 14 Emissions from a line (diffuse) source

Pollutant	Dimensions	Quantity for 250 days
CO	<b>kg/km</b>	0.2928
NMVOC	<b>kg/km</b>	0.0280
NO <sub>x</sub>	<b>kg/km</b>	6.11
N <sub>2</sub> O	<b>kg/km</b>	0.0983
NH <sub>3</sub>	<b>kg/km</b>	0.0303
Pb	<b>g/km</b>	0.0297
PM <sub>10</sub>	<b>kg/km</b>	0.3332
Ideno Pyrene	<b>g/km</b>	0.0039
B(k)F	<b>g/km</b>	0.0167
B(b)F	<b>g/km</b>	0.0150
B(a)P	<b>g/km</b>	0.0025
CO <sub>2</sub>	<b>kg/km</b>	1 845.54
SO <sub>2</sub>	<b>g/km</b>	9.40
C <sub>6</sub> H <sub>6</sub> (benzene)	<b>g/km</b>	0.84
kg/km CO <sub>2</sub> eq.		<b>1,874.63</b>

During the construction period, the amount of greenhouse gases from the site of Chiren UGS to the republic road III-208, expressed in kilograms of CO<sub>2</sub>-eq. is 1.87 tons per km.

2 NFR (Nomenclature for Reporting) – nomenclature for reporting emission-generating processes, according to the Convention on Long-range Transboundary Air Pollution (CLRTAP).

### 1.5.3.3.2. During operation

Can be systematized into the following 2 groups of point and diffuse (line) sources.

The estimate of point source emissions and diffuse source emissions - line source (transport during operation) is shown in item 1.5.3.3.2 of the EIAR.

During operation of the investment proposal related to capacity expansion of the underground gas storage Chiren, the ambient air will be polluted by various sources, which can be systematized into the following 2 groups: point sources and diffuse (line source).

#### Point sources emissions

In item 1.5.3.2 all discharge sources (point sources) are described, required for the mathematical model PLUME, which release emissions into the ambient air from the natural gas combustion process, subject to compliance with the Ordinance on medium combustion plants (MCPs) and Ordinance 1/2005, respectively.

The quantification of the annual emissions from the IU of the installations at both sites of Chiren UGS presented in Table 15, was made on the basis of the process parameters (Table 22 Parameters of discharge devices located on both sites of Chiren UGS) and the respective emission limit values for these sources, which are in natural gas injection and withdrawal mode.

Table 15 Annual emissions in tons per year from IU of Chiren UGS

Installations of:	Emissions, t/y		
	SO <sub>2</sub>	NO <sub>x</sub>	CO
Existing site	0.31	35.68	0.88
New site	0.20	85.23	0.58
<b>TOTAL</b>	<b>0.51</b>	<b>120.91</b>	<b>1.45</b>

Diffuse emissions - line source (transportation during operation)

## 8. Section 1.3.3 of the EIAR.

### 1.3.3. Infrastructure connections

#### 1.3.3.1. Road connections

Three access roads will be constructed to the site: a new road connection from asphalt road Chiren - Devene to the newly designed CS and the storage site /road connection 1/, of 6.0 m width and about 118.0 m length with asphalt pavement, and the other two access roads will begin from the existing site of Chiren UGS to the new compressor station. The construction of the new road connection requires an area of about 1.8 decares, for which a procedure for real rights acquisition will be carried out. Such road connection concerns the lands belonging to the village of Chiren, Vratsa Municipality.

In order to provide road access to the technological site for flare system at Chiren UGS and for fire protection needs, the construction of a durable pavement of crushed stone on an

existing field road with identifier 81400.1.565 is planned. The width of the pavement is 3.50 m, it will be executed at the level of the existing terrain - with one-sided transverse slope.

Drainage of road pavements from surface water will be done superficially, along the slopes of the pavement, towards the existing terrain. In the excavated sections, a lined safety drainage ditch is provided along the newly designed road link, which will divert surface water away from the reach of the road.

#### 1.3.3.2. Gas pipeline branches, pipelines and gatherings to CS Chiren UGS

The following gas pipeline branches, gas pipelines and gatherings will be designed in the lands belonging to the village of Chiren:

- A gas pipeline branch connecting the existing gas pipeline Vratsa 1 to the newly designed Compressor station with a length of about 266 m and a diameter of DN 500 mm;
- A gas pipeline branch connecting the existing gas pipeline Vratsa 2 to the newly designed Compressor station with a length of 35 m and a diameter of DN 500 mm;
- Gas pipeline connection between the new site and the site of the new flare with a length of 160 m, consisting of pipelines for - fuel gas (DN25), instrumentation air (DN25), natural gas released from the facilities with a diameter of DN250;
- Gatherings (28 gatherings) connecting the site of the CS to the existing ones of the exploitation wells with lengths varying from 400 – 500 m and a diameter of DN 150 mm;
- Displacement of the route of an existing gas gathering to Well 28, running through the territory of the new technological site to the CS with a length of 620 m and a diameter DN 150 mm;
- Displacement of the route of an existing gas gathering to Well 23, running through the territory of the new technological site to the CS with a length of 180 m and a diameter DN 150 mm;
- Displacement of the route of an existing gas pipeline Nivego with a length of about 840 m and diameter DN 50 mm, owned by Nivego OOD;
- Drainage condensate pipeline with a length of about 845m and a diameter of DN 100 mm between the new site and the fiscal warehouse located in land property with identifier 81400.37.179;
- Formation water pipeline with lengths of about 350 m and DN 100 mm, which will exit the new site to the existing one of Chiren UGS.

According to pipes' diameter and Ordinance No. 16 of 09.06.2004 for the easements of energy sites, a 30 m easement zone is set up, 15 m each on both sides of the newly designed gas pipeline branches for connection with gas pipelines Vratsa 1 and Vratsa 2 and flare system. Gas pipelines for condensate and formation water fall within the existing easement of the well gatherings. The new connections to the wells (gas gatherings) will be located in parallel and an easement zone with a width of 5 m parallel to the axis of the final gas pipelines will be established for them (gatherings). For the displaced routes of the gatherings to Wells 23 and 28 and the displaced route of the Nivego gas pipeline an easement will be established of 12 m, 6 m on both sides of the axis.



The pipelines and gas gatherings will be laid underground at a depth of min 1.0 m, measured from the upper part of the pipe according to the requirements of the Ordinance on the design and safe operation of transmission and distribution gas pipelines and on the facilities, installations and equipment for natural gas.

In this zone the following are not allowed: any type of construction, soil cultivation (plowing) of the soil at a depth greater than 0.5m, as well as lighting a fire, planting perennial tree plantations, carrying out drilling works, exploration and production of underground natural resources, parking of all types of vehicles, storage of waste and materials, actions of third parties on facilities of the energy sites, etc.

#### 1.3.3.3. Branch from an existing water supply pipeline to Chiren UGS

A new water supply branch is planned to be constructed for water supply of the expansion of Chiren UGS site. It will be supplied by the existing water supply system to Chiren UGS. It is intended to supply buildings and facilities at compressor station site with potable and household water. The water pipeline will have a diameter of 150 mm and a length of 86 m. An easement zone of 6.0m (3.0m on both sides along the axis of the pipe) is envisaged, where construction and permanent crops are not allowed.

#### 1.3.3.4. Rainwater drainage from Chiren UGS

The route of the newly designed off-site rainwater drainage, draining rainwater from the site, is envisaged to be 90m long and to be discharged together with the mixed waste water into a dry gully in Lakite area in the village of Chiren, according to Permit for waste water discharge into surface water bodies №13140017/14.06.2007. An easement zone of 6.0 m (3.0 m on both sides along pipe axis) is envisaged, where construction and permanent crops are not allowed.

Rain waters from the site will meet the requirements for discharge into surface water bodies. According to the issued discharge permit, the discharge point is at the outlet sewer collector Flow 1 with geographical coordinates B=43°20'59,9" и L=23°35'24,8" (N = 43.349972, E = 23.590222).

#### 1.3.3.5. Technological site for flare system

A new technological site for a flare system used for gas burning is planned to be constructed. The gas released manually by the various systems and devices during repair activities and normal operation will enter the flare system through a gas pipeline.

The flare system will be used to burn natural gas from:

- Purging of technological lines;
- Pressure release (manually);

All emergency and automatic release will be carried out by vents. The amount of gas to maintain the flame for combustion will be about 10 Nm<sup>3</sup>/h in both UGS operation modes (withdrawal and injection).

The technological site for the flare system will be 100/100 m.

#### 1.3.3.6. Anode grounding devices

Regarding the electrochemical protection of all underground steel pipelines (gatherings to the drilling wells), routes of anode grounding conductors outside the technological site are planned

to be constructed. The routes will be located east and west of the site. They will pass through the land of the village of Chiren,

The route to the east is about 270 m long, and the route to the west 95 m. An easement zone of 4.0 m (2.0 m on both sides along the axis of the cable) is envisaged for the routes, where construction works and permanent crops cultivation are not allowed.

## **9. (Annex II to the EIAR)**

It is presented as a separate document - Appendix 2 - General plan.

## **10. Section 2.2.3**

### 2.2.3. Facilities' capacity alternative

In order to develop a workable optimal option for UGS operation, a detailed study of the geological structure was carried out to determine its hydrodynamic regime and four main option solutions (alternatives) of operating modes at different formation pressures and flow rates were considered to maximize the operating volume and maximum daily withdrawal:

Option I with formation pressure 116 barg, gas flow 4,400,000 m<sup>3</sup>/day-1 (183,333 m<sup>3</sup>/ hour-1)

Option II with formation pressure 130 barg, gas flow 8 000 000 m<sup>3</sup>/day-1 (333,333 m<sup>3</sup>/ hour-1)

Option III with formation pressure 150 barg, gas flow 10 000 000 m<sup>3</sup>/day-1 (416,660 m<sup>3</sup>/ hour-1)

Option IV with formation pressure 180 barg, gas flow 12 000 000 m<sup>3</sup>/day-1 (500, 000 m<sup>3</sup>/ hour-1)

On the basis of the comparative analysis carried out in item 2.2.3 of the EIAR of the different possible options for the capacity of the UGS facilities, Option I, Option II and Option IV are rejected in terms of feasibility. Therefore, a comparison of the alternatives in terms of technological and economic indicators regarding the number of GTCUs will be made for Option III only.

In view of the above, this EIAR will consider and assess the potential impacts on environmental components and factors for Option III.

## **11. Section 2.2.4 of the EIAR**

### 2.2.4. In terms of the technical and economic indicators of the number of GTCUs

Based on the comparative analysis in item 2.2.3 justifying the preferred capacity of the UGS facilities for the new compressor station, item 2.2.4 of the EIAR compares the technical and economic indicators of the alternative solutions (sub-options) of Option III on the number of GTCUs - 2+1 or 3+1.

Based on comparison of the advantages and disadvantages of configuration of the number of GTCUs (Option III A: 2+1 or Option III B: 3+1, as the best option and preferred for application in the project is Option III C: 3+1 – GTCU.

## **12. Section 4.1.**

#### **4.1. Methodology for assessing the impacts on environmental components and factors**

In general, the assessment of specific impacts in the EIA Report consists in determining the source of the impact, identifying the pathway to the receptor, and finally establishing of control on the effect of the impact. That concept is reasonable and useful because it helps to understand the process and focus on control and mitigation measures in the most effective place and at the right time. The assessment of impacts defines the identified impacts according to their 'significance', which is derived from the relationship between the 'magnitude of impact' and the 'sensitivity of the receptor' with respect to an impact resulting from a specific activity related to the investment proposal.

##### *Identification of impacts*

The potential impacts have been identified in relation to the implementation of the investment proposal as a result of site and auxiliary facilities construction, commissioning and operation. Often one activity or facility has impact(s) on more than one *receptor (environmental component/factor)*. In this respect, the availability of detailed and comprehensive description of the investment proposal plays a key role, allowing for a complete identification of the expected impacts, as well as an up-to-date assessment of the significance of each of them.

The identification of expected impacts for the investment proposal has been prepared on the basis of specific activities and facilities and the results from the consultations with the stakeholders.

##### *Extent/size/magnitude of the impact*

The magnitude of the impact is usually expressed through quantitative and qualitative values compared to local, national and international standards. For some impacts, values/parameters cannot be applied. In such cases, the assessment is subjective and based on the expert's experience and the good international practice. In case of emergencies (catastrophes, natural disasters, accidents), impacts are considered in the context of the probability of the event and its consequences.

In general, the criteria for extent/size/magnitude of the impact can be considered as:

*Over time, e.g. duration of recovery or of impact;*

*In space, according to the physical extent of impact;*

*Quantitatively or qualitatively, where indicators of the status of the respective component/factor can be applied.*

##### *Receptors/resources sensitivity*

For the purpose of impact assessment, an assessment is made of the quality of the impact receptor or so-called receptor. In general, it can be summarized that receptors are all environmental components.

In the course of assessment, the sensitivity/importance of each receptor has been determined by applying individual, quantitative and/or qualitative criteria, defined separately for each environmental component/factor in the EIA Report, the part, concerning the assessment of expected impacts. These criteria take into account the specific characteristics of the receptor in terms of:

*Current status of the receptor - geographic distribution, presence and abundance, value (conservation status), etc.;*

*Capacity to restore resistance to stress;*

*Recovery period, etc.;*

All these factors determine the sensitivity of the receptor. For the specific IP, a 7-level scale of the receptor sensitivity/value is applied, shown in the impact assessment matrix.

Assessment of impacts

The expected impacts from implementation of the investment proposal are heterogeneous and can be defined in different ways. For the project, the expected impacts are assessed as:

- direct or indirect;*
- primary and secondary;*
- positive and negative depending from the final effect;*
- reversible (for a certain period of time) and irreversible (permanent);*
- short, medium and long term;*
- local, regional, national or cross-border;*
- as a result of routine activity or in case of accidents.*

In addition to the impacts listed above, potential cumulative impacts are also identified and assessed in the EIA Report. They can occur as a result of different types of interaction:

- with accumulation - the total effect from various impacts in a particular receptor;*
- in case of interaction - different impacts interact with each other to produce a new significant impact;*
- with add-on effect - the effect from the impacts from the proposed development and other existing or planned projects in the immediate vicinity;*
- over time - a series of impacts that occur at different points in time, which individually are not important but cumulatively over the period are significant.*

The assessment of impacts on receptors/receiving environment was prepared by considering the sensitivity/value of the receptor or the resource and the magnitude/severity of impact summarized in the following matrix:

Impact degree/ size/magnitude	Receptor sensitivity /Value of the receptor or the resource						
	Extremely low	Very low	Low	Medium	High	Very high	Extremely high
Positive (high positive)							
Low positive							
Very low positive							
Insignificantly positive							
Without change							
Insignificantly negative							
Negative (low negative)							

High negative							
Very high negative							

The impact significance determined as per the matrix in the figure above does not take into account the implementation of mitigation measures. The matrix defines the significance in seven main groups:

**Impacts with strong/high positive significance** - may be associated with a long-term or permanent positive effect, with impact over a very large area, etc.

**Impacts of moderate (medium) positive significance** - noticeable and pronounced impact over a large area and with a prolonged period of occurrence

**Impacts of low/low positive significance**- associated with temporary, short-term, time and area limited impacts

**Impacts of minor positive significance** – expected positive impact occurring in very small quantities over a small area, a negligible impact or a very short period of action with complete reversibility. No measures required.

No impact is expected and no mitigation measures are required.

**Impacts of negligible negative significance** –negative impact is expected occurring in very small quantities over a small area, a negligible impact or a very short period of action with complete reversibility. No measures required.

**Impacts of low/low negative significance** - manifested by temporary, short-term, limited in time and area, easily reversible impacts, etc. Mitigation measures may be necessary and may be avoided without special measures other than following best practices during operation.

**Impacts of moderate (medium) negative significance** - needed to be considered in combination with other factors, resulting from medium or long-term, permanent negative impacts, on large area, secondary, cumulative, synergistic. Need to be reduced or mitigated by mitigation/compensation measures or by selection of alternatives.

**Impacts of high/high negative significance** – constant, irreversible impact of high intensity, over a significant area, affecting important components of the environment. The impact cannot be avoided/mitigated by selecting alternatives or applying mitigation/compensation measures.

However, strict distinction between these groups is not possible and in many cases the final assessment of impact significance falls somewhere in between.

Due to the fact that assessing the significance of impacts is not a precise discipline, a simple approach with numbers or quantitative indicators is not always possible in the impact assessment process. Sometimes the assessment is subjective and relies on observations or the subjective professional opinion of the respective expert or of third parties.

In view of this, a multidisciplinary approach has been adopted in the assessment of impacts for the IP, where the opinion of experts, based on their many years of experience in their respective fields, has also been used to verify the outcome of the application of the matrix presented above.

In some cases, where appropriate, environmental risks have also been identified, depending on the significance of the impact and the likelihood of its occurrence. The degree of risk is defined in three groups:

*significant, unacceptable risk to the environment;*  
*acceptable risk for which mitigation measures and control of impacts need to be envisaged;*  
*and*  
*low risk for which no mitigation measures are necessary.*

### **13. Tables in item 3.1.2. of the EIA Report.**

#### **3.1.2. Ambient air quality standards**

In the tables in item 3.1.2 of the EIAR, the air quality standards from EU directives and national legislation are systematized.

Directive 2008/50/EC on ambient air quality and cleaner air for Europe creates a framework for air quality assessment at EU level and repeals and replaces the previous air quality directive (96/62/EC), and the three daughter directives (1999/30/EC, 2000/69/EC, 2002/3/EC), and Decision 97/101/EC of the Council of Europe.

Directive 2008/50/EC is supplemented by Directive 2004/107/EC related to the concentrations of arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in the ambient air.

In Bulgarian legislation, these directives are transposed in Ordinance No. 11 of May 14, 2007 on the norms for arsenic, cadmium, nickel and polycyclic aromatic hydrocarbons in the ambient air and Ordinance No. 12 of July 15, 2010 – on limit values for sulphur dioxide, nitrogen dioxide, fine particulate matter, lead, benzene, carbon monoxide and ozone in the ambient air.

In 45 and 46 the air quality standards from the two directives and the national legislation are systematized.

Table 45 Human health protection standards

Pollutant	Concentration	Dimensions	Average period	Exceedances allowed	Lower assessment threshold (LAT)	Upper assessment threshold (UAT)
<b>LIMIT VALUE</b>						
PM <sub>2.5</sub>	25 Stage 1-2015	µg/m <sup>3</sup>	1 year	-	12 <sup>3</sup>	17 <sup>4</sup>
	20 Stage 2-2020					
Sulphur dioxide (SO <sub>2</sub> )	350	µg/m <sup>3</sup>	1 hour	24	-	-
	125	µg/m <sup>3</sup>	24 hours	3	50	75
Nitrogen dioxide (NO <sub>2</sub> )	200	µg/m <sup>3</sup>	1 hour	18	100	140
	40	µg/m <sup>3</sup>	1 year	-	26	32

3 Set based on 50% of the norm for stage 1 (25 µg/m<sup>3</sup>). It is kept even after 2015 at a rate of 20 µg/m<sup>3</sup>, (stage 2).

4 Set based on 70% of the norm for stage 1 (25 µg/m<sup>3</sup>). Kept even after 2015 (stage 2) at a rate of 20 µg/m<sup>3</sup>.

Pollutant	Concentration	Dimensions	Average period	Exceedances allowed	Lower assessment threshold (LAT)	Upper assessment threshold (UAT)
ΦΠЧ <sub>10</sub>	50	µg/m <sup>3</sup>	24 hours	35	25	35
	40	µg/m <sup>3</sup>	1 year	-	20	28
Lead (Pb)	0.5	µg/m <sup>3</sup>	1 year	-	0.25	0.35
Carbon monoxide (CO)	10	µg/m <sup>3</sup>	Max 8 hours average	-	5	7
Benzene (C <sub>6</sub> H <sub>6</sub> )	5	µg/m <sup>3</sup>	1 year	-	2	3.5
TARGET VALUE						
Ozone (O <sub>3</sub> )	120	µg/m <sup>3</sup>	Max 8 hours average	25 days on average for 3 years	-	-
Arsenic (As)	6	µg/m <sup>3</sup>	1 year	n/a	2.4	3.6
Cadmium (Cd)	5	µg/m <sup>3</sup>	1 year	n/a	2	3
Nickel (Ni)	20	µg/m <sup>3</sup>	1 year	n/a	10	14
Polycyclic aromatic hydrocarbons (PAH)	1	Concentration of Benzo(a)pyrene	1 year	n/a	0.4	0.6

Table 46 Critical level for the protection of vegetation and ecosystems

Pollutant	Concentration	Dimensions	Average period	Exceedances allowed	Lower assessment threshold (LAT)	Upper assessment threshold (UAT)
Sulphur dioxide (SO <sub>2</sub> ) <sub>5</sub>	20	µg/m <sup>3</sup>	1 year winter (1 October -31 March)	-	8	12
Nitrogen dioxide (NO <sub>2</sub> )	30	µg/m <sup>3</sup>	1 year	-	19.5	24

For certain regions, depending on the nature of the sources of emissions and the particular health risk, the Minister of Environment and Water, on his own initiative, as well as on the

proposal of the Minister of Health or the municipal authorities, may determine additional indicators.

In hydrogeological aspect, this investment proposal is related to the groundwater bodies formed in the basin of Iskar River and in particular to the karst waters formed in the Marble karst basin (Urgonian limestones) - groundwater body BG1G000K1ap043 - Karst waters in the Marble massif - see **Appendix 6** of the EIA Report.

The IP does not fall within the boundaries of protected areas within the meaning of the Protected Areas Act (PAA), as well as within the boundaries of protected areas of Natura 2000 network. The nearest protected areas and protected zones are listed in item 3.6.3.1 of the EIA Report.

The IP does not fall within the boundaries of protected areas within the meaning of the Protected Areas Act (PAA), as well as within the boundaries of protected areas of Natura 2000 network. The nearest protected areas are:

*Natural site "Ponora", located 4.1 km from the IP;*

*Natural site "Bozhite mostove", located at 4.3 km from the IP.*

The nearest protected areas are:

*33 BG0000487 "Bozhite mostove" for conservation of natural habitats and wild flora and fauna, located at 4.6 km from the IP.*

*33 BG0000594 "Bozhiya most-Ponora" for conservation of natural habitats and wild flora and fauna, located at 3.2 km from the IP.*

The closest protected areas and protected zones to the IP site are presented in **Appendix 4**.

Natural site "Ponora" was declared for protection water cave by Order No. 2810 of 10.10.1962, SG No. 56/1963. Its area is 90.0 ha.

Purpose of announcement - water cave. Mode of activities:

*The collection of stones and opening of quarries in the area of the natural site are prohibited;*

*It is forbidden to enter the caves, destroy and break the formations (stalactites and stalagmites in them), as well as pollute them;*

*The collection or destruction of cave fauna is prohibited;*

*It is forbidden to write and scribble on the walls, enter with torches and other smoky lighting, as well as any actions that lead to endangering or destroying the caves;*

*The use of caves for economic purposes (mushroom farms, wine cellars, dairies, etc.) is prohibited.*

The natural site "Bozhite mostove" was declared for protection of rocks by Order No. 378 of 05.02.1964, SG No. 12/1966. Its area is 15.0 ha.

Purpose of announcement - rocks. Mode of activities:

*It is prohibited to open quarries, collect stones, dig earth, collect and destroy the cave fauna, enter the caves without permission, break the formations, scratch on the walls, etc.;*

*It is forbidden to afforest in any way the caves in the areas of the rock formations.*

33 BG0000594 "Bozhiya most – Ponora" for conservation of natural habitats and wild flora and fauna was announced by Order ПД-262 of 31.03.2021, pursuant to Art. 12, para. 6 in



connection with Art. 6 para. 1, items 1 and 2 of the BDA and item 2 of Decision No. 122 of 02.03.2007, (SG No. 21/2007) amended by decisions of the Council of Ministers No. 52 of 05.02.2008 (SG No. 14/2008) and No. 615 of 2.09.2020 (SG No. 79/2020). The area of the zone is 227.9 ha.

Subjects of conservation in the zone are:

Natural habitats under Art. 6, para. 1, item 1 of the Biological Diversity Act (BDA):

*8310 Undeveloped caves;*

*91M0 Balkan-Pannonian Cerovo-Gorun forests.*

*Habitats of species under Art. 6, para. 1, item 2 of the BDA:*

*mammals – large horseshoe bat (Rhinolophus ferrumequinum), southern horseshoe bat (Rhinolophus euryale), big night bat (Myotis myotis), sharp-eared night bat (Myotis blythii), long-toed night bat (Myotis capaccinii), long-winged bat (Miniopterus schreibersii);*

*invertebrates – stag beetle (Lucanus cervus), great capricorn beetle (Cerambyx cerdo).*

33 BG0000487 Bozhite mostove for conservation of natural habitats and wild flora and fauna was declared by Decision No. 122 of 02.03.2007, (SG No. 21/2007). The area of the zone is 47.4463 ha.

Subjects of conservation in the zone are:

Natural habitats under Art. 6, para. 1, item 1 of the Biological Diversity Act (BDA):

*3140 Hard oligo-mesotrophic waters with benthic vegetation of Chara;*

*6110 Open calciphilous or basiphilous grasslands of Alysso-Sedion albi;*

*8210 Chasmophytic vegetation on limestone rock slopes;*

*8310 Undeveloped caves.*

Habitats of species under Art. 6, para. 1, item 2 of the BDA:

*mammals - wolf (Canis lupus), big horseshoe bat (Rhinolophus ferrumequinum), southern horseshoe bat (Rhinolophus euryale), smooth-nosed bats (Myotis myotis), lesser mouse-eared bat (Myotis blythii), long-fingered bat (Myotis capaccinii), common bent-wing bat (Miniopterus schreibersii), three-colored night bat (Myotis emarginatus), Rhinolophus blasii, little horseshoe bat (Rhinolophus hipposideros), southern horseshoe bat (Rhinolophus mehelyi), marbled polecat (Vormela peregusna);*

*amphibians and reptiles - yellow-bellied toad (Bombina variegata), Spur-thighed tortoise (Testudo graeca), spiny-tailed turtle (Testudo hermanni), great crested newt (Triturus karelinii);*

*invertebrates – horned beetle (Lucanus cervus), common capricorn beetle (Cerambyx cerdo), Dioszeghyana schmidtii, longhorn beetle (Morimus funereus).*

#### **14. Annex 6 of the EIA Report.**

It is presented a separate document - Appendix 6 - Underground water map

#### **15. Item 3.6.3.1 of the EIA Report.**

##### 3.6.3.1

Protected areas and protected zones

Existing status

The IP does not fall within the boundaries of protected areas within the meaning of the Protected Areas Act (PAA), as well as within the boundaries of protected areas of Natura 2000 network. The nearest protected areas are:

- Natural site "Ponora", located 4.1 km from the IP;
- Natural site "Bozhite mostove", located at 4.3 km from the IP.

The nearest protected areas are:

- 33 BG0000487 Bozhite mostove for conservation of natural habitats and wild flora and fauna, located at 4.6 km from the IP.
- 33 BG0000594 Bozhiya most-Ponora for conservation of natural habitats and wild flora and fauna, located at 3.2 km from the IP.

The closest protected areas and protected zones to the IP site are presented in Appendix 4.

Natural site "Ponora" was declared for protection water cave by Order No. 2810 of 10.10.1962, SG No. 56/1963. Its area is 90.0 ha.

Purpose of announcement - water cave. Mode of activities:

- The collection of stones and opening of quarries in the area of the natural site are prohibited;
- It is forbidden to enter the caves, destroy and break the formations (stalactites and stalagmites in them), as well as pollute them;
- The collection or destruction of cave fauna is prohibited;
- It is forbidden to write and scribble on the walls, enter with torches and other smoky lighting, as well as any actions that lead to endangering or destroying the caves;
- The use of caves for economic purposes (mushroom farms, wine cellars, dairies, etc.) is prohibited.

The natural site Bozhite mostove was declared for protection of rocks by Order No. 378 of 05.02.1964, SG No. 12/1966. Its area is 15.0 ha.

Purpose of announcement - rocks. Mode of activities:

- It is prohibited to open quarries, collect stones, dig earth, collect and destroy the cave fauna, enter the caves without permission, break the formations, scratch on the walls, etc.;
- It is forbidden to afforest in any way the caves in the areas of the rock formations.

33 BG0000594 Bozhiya most - Ponora for conservation of natural habitats and wild flora and fauna was announced by Order ПД-262 of 31.03.2021, pursuant to Art. 12, para. 6 in connection with Art. 6 para. 1, items 1 and 2 of the BDA and item 2 of Decision No. 122 of 02.03.2007, (SG No. 21/2007) amended by decisions of the Council of Ministers No. 52 of 05.02.2008 (SG No. 14/2008) and No. 615 of 2.09.2020 (SG No. 79/2020). The area of the zone is 227.9 ha.

Subjects of conservation in the zone are:

Natural habitats under Art. 6, para. 1, item 1 of the Biological Diversity Act (BDA):

- 8310 Undeveloped caves;
- 91M0 Balkan-Pannonian Cerovo-Gorun forests.
- Habitats of species under Art. 6, para. 1, item 2 of the BDA:
  - mammals – large horseshoe bat (*Rhinolophus ferrumequinum*), southern horseshoe bat (*Rhinolophus euryale*), big night bat (*Myotis myotis*), sharp-eared night bat (*Myotis blythii*), long-toed night bat (*Myotis capaccinii*), long-winged bat (*Miniopterus schreibersii*);
  - invertebrates – stag beetle (*Lucanus cervus*), great capricorn beetle (*Cerambyx cerdo*).

33 BG0000487 Bozhite mostove for conservation of natural habitats and wild flora and fauna was declared by Decision No. 122 of 02.03.2007, (SG No. 21/2007). The area of the zone is 47.4463 ha.

Subjects of conservation in the zone are:

Natural habitats under Art. 6, para. 1, item 1 of the Biological Diversity Act (BDA):

- 3140 Hard oligo-mesotrophic waters with benthic vegetation of *Chara*;
- 6110 Open calciphilous or basiphilous grasslands of *Alyso-Sedion albi*;
- 8210 Chasmophytic vegetation on limestone rock slopes;
- 8310 Undeveloped caves.

Habitats of species under Art. 6, para. 1, item 2 of the BDA:

- mammals - wolf (*Canis lupus*), big horseshoe bat (*Rhinolophus ferrumequinum*), southern horseshoe bat (*Rhinolophus euryale*), smooth-nosed bats (*Myotis myotis*), lesser mouse-eared bat (*Myotis blythii*), long-fingered bat (*Myotis capaccinii*), common bent-wing bat (*Miniopterus schreibersii*), three-colored night bat (*Myotis emarginatus*), *Rhinolophus blasii*, little horseshoe bat (*Rhinolophus hipposideros*), southern horseshoe bat (*Rhinolophus mehelyi*), marbled polecat (*Vormela peregusna*);
- amphibians and reptiles - yellow-bellied toad (*Bombina variegata*), Spur-thighed tortoise (*Testudo graeca*), spiny-tailed turtle (*Testudo hermanni*), great crested newt (*Triturus karelinii*);
- invertebrates – horned beetle (*Lucanus cervus*), common capricorn beetle (*Cerambyx cerdo*), *Dioszeghyana schmidtii*, longhorn beetle (*Morimus funereus*).

## **16. Table 1 and Table 2 of the EIA Report.**

### **4.2.1.3. Assessment methodology**

The ambient air impact assessment, **described in item 4.1 - Methodology for assessment of the impacts of this EIA Report**, resulting from the construction and operation of the investment proposal has been made according to the criteria of ambient air quality (AAQ), in accordance with Regulation No. 11 of 14 May 2007 on the norms for arsenic, cadmium, nickel and polycyclic aromatic hydrocarbons in ambient air and Regulation No. 12 of 15 July 2010 on limit values for sulphur dioxide, nitrogen dioxide, fine particulate matter,

lead, benzene, carbon monoxide and ozone in ambient air and Ordinance No 7 on ambient air quality assessment and management.

Table 76 Assessment criterion degree/size/magnitude of impact

Impact degree/ size/ magnitude	Criterion
<b>Positive (high positive):</b>	<i>Long-term, steady</i> improvement of the AAQ – an impact as a result of which ground-level concentrations in the area <b><u>never exceed the LAT</u></b> (Lower Assessment Threshold) of the relevant gas and dust pollutants.
<b>Low positive:</b>	<i>Local</i> improvement of the AAQ <i>with potential for long-term</i> impact as a result of which ground-level concentrations in the area <b><u>very rarely exceed the LAT</u></b> and do not exceed the <b>UAT</b> (Upper Assessment Threshold) of the relevant gas and dust pollutants.
<b>Very low positive:</b>	<i>Local, temporary</i> improvement of the AAQ - impact, as a result of which ground concentrations in the area <b><u>rarely exceed UAT and do not exceed the LM (limit value) or the TV (target value)</u></b> of the relevant gas and dust pollutants.
<b>Insignificantly positive:</b>	<i>Local, periodic</i> improvement of the AAQ - impact, as a result of which the ground-level concentrations in the area are <b><u>more often below the LV (limit value) or TV</u></b> (target value) of the relevant gas and dust pollutants.
<b>Without change:</b>	An impact that does not lead to either an improvement or a deterioration of the AAQ in the area.
<b>Insignificantly negative</b>	<i>Local, periodic</i> deterioration of the AAQ – an impact as a result of which ground-level concentrations in the area <b>exceed the LAT</b> (Lower Assessment Threshold) of the relevant gas and dust pollutants.
<b>Negative (low negative):</b>	<i>Local, temporary</i> deterioration of the AAQ - an impact, as a result of which ground-level concentrations in the area <b><u>often exceed the LAT, but do not exceed the LV</u></b> (limit value) or <b>TV</b> (target value) of the relevant gas and dust pollutants.
<b>High negative:</b>	<i>Local deterioration</i> of the AAQ <i>with the potential for long-term</i> impact, as a result of which ground-level concentrations in the area <b><u>very often exceed the UAT and are below the LM (limit value) or the TV (target value)</u></b> of the relevant gas and dust pollutants.
<b>Very high negative:</b>	<i>Local, steady</i> deterioration of the AAQ - impact, as a result of which the ground-level concentrations in the area are <b>above the LV (limit value) or TV (target value)</b> of the relevant gas and dust pollutants.

Table 77 Assessment criteria receptor's sensitivity

Receptor's sensitivity	In terms of noise and vibrations generated in the environment
<b>Extremely low:</b>	Industrial areas, as well as work sites (work environment) in the chemical industry, waste and wastewater treatment, refineries, etc.
<b>Very low:</b>	Areas with concentrations between UAT and LV or TV.

<b>Low:</b>	Areas and agglomerations with concentrations between UAT and LAT.
<b>Average:</b>	Areas and agglomerations with concentrations above UAT
<b>High:</b>	Areas of public establishments of the food industry, food and beverage processing and packaging enterprises, residential buildings, places of recreation, camping and sport facilities, places of recreation
<b>Very high:</b>	Areas with hospitals, schools, kindergartens or playgrounds, retirement homes for elderly persons, rehabilitation centres.
<b>Extremely high:</b>	Areas for the most vulnerable population groups – young children, pupils and elderly people who occupy the respective places regularly or for a longer period of time and have a high sensitivity to changes in the concentrations of pollutants in the air.

## 4.3. Waters

### 4.3.1. Surface waters

#### 4.3.1.1. Assessment methodology

The assessment of the impact on surface water resulting from the construction and operation of the investment proposal has been made on the basis of the applicable regulatory requirements in the country and the Impact assessment methodology described in item 4.1 of this EIA Report.

Table 78 Assessment criterion degree/size/magnitude of impact

<b>Impact degree/size/magnitude</b>	<b>Criterion</b>
<b>Positive (high positive):</b>	<i>A high positive impact is a long-term impact of a positive nature, associated with multiple parameters, low probability of recovery of the indicators from the baseline/existing level. The surface water body is affected in a number of areas. Changes in quality indicators over 50%.</i>
<b>Low positive:</b>	<i>A low positive impact is an impact of a positive nature on the water body at the local level and short-term in nature, with the potential for full recovery and affecting more than one parameter. The surface water body is affected in a number of areas. Parameter changes range from 20% to 50%.</i>
<b>Very low positive:</b>	<i>A very low positive impact is an impact of a positive nature on the water body at local level and short-term in nature, with the potential for full recovery and affecting no more than one parameter. The surface water body is affected in one area. Changes in indicators are in the percentage range of 10% to 20%.</i>
<b>Insignificantly positive:</b>	<i>A minor positive impact is an impact on a water body at a local level, short-term and positive in nature and with the potential for full recovery and affecting one parameter. The surface water body is affected in one area. Change of the affected indicator no more than 10%.</i>
<b>Without change:</b>	<i>It does not result in a change in the parameters of the surface water body.</i>

Impact degree/size/magnitude	Criterion
<b>Insignificantly negative</b>	<i>A minor negative impact is an impact on a water body at a local level, short-term and negative in nature and with the potential for full recovery and affecting one parameter. The surface water body is affected in one area. Changes of the affected indicator are no more than 10%.</i>
<b>Negative (low negative):</b>	<i>A low negative impact is a negative impact on the water body at the local level and short-term in nature, with the potential for full recovery and affecting no more than one parameter. The surface water body is affected in one area. The changes of the affected indicators are from 10% to 20%.</i>
<b>High negative:</b>	<i>A high negative impact is an impact on the water body at the local level and short-term, negative in nature, with the potential for full recovery and affecting more than one parameter. The surface water body is affected in a number of areas. The changes of the affected indicators are from 20% to 50%.</i>
<b>Very high negative:</b>	<i>A very high negative impact is a long-term impact of negative nature, affecting multiple parameters and low probability of recovery of the indicators of the baseline/existing level. The surface water body is affected in a number of areas. The changes of the affected indicators are above 50%.</i>

Table 79 Assessment criteria receptor's sensitivity

Receptor's sensitivity	Regarding surface waters
<b>Extremely low:</b>	<i>Extremely low-sensitive water bodies defined according to the Water Framework Directive (WFD) in ecological status "poor" and "very poor" and chemical status "not good".</i>
<b>Very low:</b>	<i>Very low-sensitivity water bodies, defined under the WFD in ecological status "moderate" and a chemical status of "not good".</i>
<b>Low:</b>	<i>Low-sensitive water bodies defined under the WFD in ecological status 'poor', 'very poor' or 'moderate' and a chemical status 'unknown'. or Low-sensitive water bodies, defined according to the WFD in ecological status "unknown" and a chemical status of "not good".</i>
<b>Average:</b>	<i>Water bodies defined under the WFD in ecological status "moderate", "poor" or "very poor" and a chemical status "good". or Water bodies defined under the WFD in ecological status "unknown" and chemical status "poor" or "unknown".</i>
<b>High:</b>	<i>Highly sensitive water bodies defined under the WFD in ecological status "good" or "excellent" and a chemical status "unknown". or</i>

<b>Receptor's sensitivity</b>	<b>Regarding surface waters</b>
	<i>Highly sensitive water bodies defined under the WFD in ecological status "unknown" and chemical status "good".</i>
<b>Very high:</b>	<i>Very highly sensitive water bodies defined according to the WFD in ecological status "moderate" and chemical status "good".</i>
<b>Extremely high:</b>	<i>Extremely sensitive water bodies defined according to the WFD in ecological status "excellent" or "good" and chemical status "good".</i>

### 4.3.2. Groundwater

#### 4.3.2.1. Assessment methodology

The assessment of the impact on groundwater resulting from the construction and operation of the investment proposal has been made on the basis of the applicable in the country regulatory requirements and the impact assessment methodology described in item 4.1 of this EIA Report. For the purpose of relevance of the assessments regarding surface waters and groundwater, as well as their compliance with the measures and objectives set out in the RBMP 2016-2021, the methodology applied for assessment of the impacts on groundwater bodies has similar criteria to that for surface water bodies.

Table 81 Assessment criterion degree/size/magnitude of impact

<b>Impact degree/size/magnitude</b>	<b>Criterion</b>
<b>Positive (high positive):</b>	<i>A high positive impact is a long-term impact of a positive nature, associated with multiple parameters and low probability of recovery of the indicators from the baseline/existing level. The groundwater body is affected in a number of areas. Changes in qualitative indicators and quantitative parameters over 50%.</i>
<b>Low positive:</b>	<i>A low positive impact is an impact of a positive nature on the water body at the local level and short-term in nature, with the potential for full recovery and affecting more than one parameter. The groundwater body is affected in a number of areas. Parameters' changes range from 20% to 50%.</i>
<b>Very low positive:</b>	<i>A very low positive impact is an impact of a positive nature on the water body at local level and short-term in nature, with the potential for full recovery and affecting no more than one parameter. The groundwater body is affected in one area. Changes in indicators are in the percentage range of 10% to 20%.</i>
<b>Insignificantly positive:</b>	<i>A minor positive impact is an impact on a water body at a local level, short-term and positive in nature and with the potential for full recovery and affecting one parameter. The groundwater body is affected in one area. Change of the affected indicator no more than 10%.</i>

<b>Impact degree/size/magnitude</b>	<b>Criterion</b>
<b>Without change:</b>	<i>It does not result in a change in the parameters of the groundwater body.</i>
<b>Insignificantly negative</b>	<i>A minor negative impact is an impact on a water body at a local level, short-term and negative in nature and with the potential for full recovery and affecting one parameter. The groundwater body is affected in one area. Changes of the affected indicator are no more than 10%.</i>
<b>Negative (low negative):</b>	<i>A low negative impact is a negative impact on the water body at the local level and short-term in nature, with the potential for full recovery and affecting no more than one parameter. The groundwater body is affected in one area. The changes of the affected indicators are from 10% to 20%.</i>
<b>High negative:</b>	<i>A high negative impact is an impact on the water body at the local level and short-term, negative in nature, with the potential for full recovery and affecting more than one parameter. The surface water body is affected in a number of areas. The changes of the affected indicators are from 20% to 50%.</i>
<b>Very high negative:</b>	<i>A very high negative impact is a long-term impact of negative nature, affecting multiple parameters and low probability of recovery of the indicators of the baseline/existing level. The groundwater body is affected in a number of areas. The changes of the affected indicators are above 50%.</i>

Table 82 Assessment criteria receptor's sensitivity

<b>Receptor's sensitivity</b>	<b>Regarding groundwater</b>
<b>Extremely low:</b>	<i>Extremely low-sensitive water bodies, defined according to the WFD in "poor" chemical and quantitative status and which, according to risk assessment, were assessed as being at risk.</i>
<b>Very low:</b>	<i>Extremely low-sensitive water bodies, defined according to the WFD no in "poor" chemical and quantitative status and which, according to risk assessment, were assessed as being at no risk.</i>
<b>Low:</b>	<i>Low-sensitive water bodies, defined according to the WFD in a chemical status "poor" and a quantitative status "good", as well as according to the risk assessment, were assessed as being at risk.</i>  or <i>Low-sensitive water bodies, defined according to the WFD in a chemical status "good" and a quantitative status "poor", as well as according to the risk assessment, were assessed as being at risk.</i>
<b>Average:</b>	<i>Water bodies defined according to the WFD in chemical status "poor" and quantitative status "good", as well as according to the risk assessment, were assessed as not being at risk.</i>  or



<b>Receptor's sensitivity</b>	<b>Regarding groundwater</b>
	<i>Water bodies defined according to the WFD in chemical status "good" and quantitative status "poor", as well as according to the risk assessment, were assessed as not being at risk.</i>
<b>High:</b>	<i>Highly sensitive water bodies defined under the WFD in chemical status "good" and quantitative status "unknown", assessed as being at risk.</i>
<b>Very high:</b>	<i>Very highly sensitive water bodies defined under the WFD in chemical status "good" and quantitative status "unknown", assessed as not being at risk.</i>
<b>Extremely high:</b>	<i>Very sensitive water bodies, defined according to the WFD in a chemical status "good" and a quantitative status "unknown", assessed as not being at risk and for which no data on the potential to affect any activities is available to date.</i>

## 4.4. Soils

### 4.4.1. Assessment methodology

The assessment of impacts on soils has been made on the basis of the described in item 4.1 of this EIA Report Impact Assessment Methodology and the current regulatory framework.

Table 83 Assessment criterion degree/size/magnitude of impact

<b>Impact degree/ size/ magnitude</b>	<b>Criterion</b>
<b>Positive (high positive):</b>	<i>Restoration and improvement of eroded, polluted, saline, acidified and marshy agricultural lands as a complex set of measures or technologies aimed at:</i> 1. restoration of the disturbed ecological functions of the soil cover; 2. reduction or elimination of health and veterinary risks from the use of plant and animal products; 3. preserving and increasing soil fertility.
<b>Low positive:</b>	
<b>Very low positive:</b>	
<b>Insignificantly positive:</b>	
<b>Without change:</b>	<i>Soils are not affected.</i>
<b>Insignificantly negative:</b>	<i>Indirect negative impacts on soils from emissions of construction equipment and medium combustion plants or pollution from household waste</i>
<b>Negative (low negative):</b>	<i>Direct negative impacts on soils from various construction activities. Destruction or temporary damage to soils of medium and low quality and productivity – poor, shallow, degraded, saline, swampy, highly eroded soils.</i>  <i>Direct temporary impacts on soils of high quality, but with the possibility of full recovery of soil over time or by means of measures.</i>

Impact degree/ size/ magnitude	Criterion
<b>High negative:</b>	<i>Destruction of soils with high productivity characteristics or soils of high nature value (HNV) lands, supporting rare or endangered species.</i>
<b>Very high negative:</b>	<i>Destruction of soils with very high productivity qualities and valuable characteristics and/or soils in protected areas and territories supporting rare, endangered or conservation significant species.</i>

Table 84 Assessment criteria receptor's sensitivity

Receptor's sensitivity	Regarding soils as a non-renewable natural resource
<b>Extremely low:</b>	<i>Anthropogenic soils, irreversibly damaged and heavily polluted as a result of human activity - the soil profile is damaged and pollutants are observed at depth. Soil toxicity is present.</i>
<b>Very low:</b>	<i>Anthropogenic soils with a highly modified soil profile, including artifacts of unnatural origin - crushed/pulverized remains of construction materials - bricks, tiles, concrete, etc.</i>
<b>Low:</b>	<i>Degraded soils - harmful acidity, salinisation, swamping, strong erosion</i>
<b>Average:</b>	<i>Low productivity soils, shallow with an underdeveloped soil profile or in the initial phase of soil formation, very stony</i>
<b>High:</b>	<i>Lands in agricultural areas with productive soils with preserved soil profile and low degree of anthropogenization</i>
<b>Very high:</b>	<i>Highly productive soils in areas where agriculture is the main (usually predominant) land use and agricultural activity supports or is associated with a high diversity of species or habitats or of species of European conservation importance, or both. Organic farming</i>
<b>Extremely high:</b>	<i><b>Virgin</b> soils in protected areas and territories with a preserved soil profile, high productive properties, extremely important for protection of biological diversity.</i>

## 4.5. Subsoil and mineral diversity

### 4.5.1. Assessment methodology

The assessment of the impact on the subsoil resulting from construction and operation of the investment proposal is made on the basis of the regulatory requirements in force in the country and the impact assessment methodology described in item 4.1 of this EIA Report.

Table 65 Assessment criterion degree/size/magnitude of impact

<b>Impact degree/ size/ magnitude</b>	<b>Criterion</b>
<b>Positive (high positive):</b>	<i>When the impact can cause deactivation of physical and geological processes beyond the scope of the affected territory</i>
<b>Low positive:</b>	<i>When the positive impact on the geological basis occupies a larger area and is at a greater depth - over 6 m, as well as the possibility of deactivating local physical and geological phenomena and processes within the scope of the affected territory</i>
<b>Very low positive:</b>	<i>Impacts leading to restoration of disturbed terrains affecting a limited area and damage to the geological basis up to 6 m</i>
<b>Insignificantly positive:</b>	<i>Indirect positive impact on the geological basis. Impacts leading to restoration of disturbed terrains, affecting a small area and damage to the geological basis up to 3 m</i>
<b>Without change:</b>	<i>There is no impact on the geological environment</i>
<b>Insignificantly negative</b>	<i>There is no direct impact on the geological environment or in cases of impact on the geological basis, it affects a small area and at a depth of up to 3 m</i>
<b>Negative (low negative):</b>	<i>When the impact on the geological basis is in a area limited or at a relatively shallow depth of up to 6 m</i>
<b>High negative:</b>	<i>When the impact on the geological basis occupies a larger area and is at a greater depth - over 6 m, as well as the possibility of activation of local physical and geological phenomena and processes within the scope of the affected territory</i>
<b>Very high negative:</b>	<i>When the impact can cause activation of physical and geological processes beyond the scope of the affected territory</i>

Table 86 Assessment criteria receptor's sensitivity

<b>Receptor's sensitivity</b>	<b>In terms of subsoil and mineral diversity</b>
<b>Extremely low:</b>	<i>Areas of natural resources extraction with established human intervention</i>

<b>Receptor's sensitivity</b>	<b>In terms of subsoil and mineral diversity</b>
<b>Very low:</b>	<i>Areas of no geological and paleontological significance with known human intervention</i>
<b>Low:</b>	<i>Known areas of natural resources extraction without established human intervention so far</i>
<b>Medium:</b>	<i>Areas of no geological and palaeontological significance without established human intervention so far</i>
<b>High:</b>	<i>Areas in the immediate vicinity of nature reserves intended for protection of geological and/or paleontological values and geoparks included in the European and global geopark networks, as well as those included in scientific reserves intended for protection of geological and paleontological values and areas important for geological and/or paleontological studies</i>
<b>Very high:</b>	<i>Areas within the boundaries of nature reserves intended for protection of geological and/or paleontological values and geoparks included in the European and global geopark networks</i>
<b>Extremely high:</b>	<i>Areas included in scientific reserves intended for protection of geological and paleontological values and areas important for geological and/or paleontological studies</i>

## 4.6. Landscape and natural sites

### 4.6.1. Assessment methodology

The assessment of the impact on the subsoil resulting from construction and operation of the investment proposal is made on the basis of the regulatory requirements in force in the country and the impact assessment methodology described in item 4.1 of this EIA Report.

Table 87 Assessment criterion degree/size/magnitude of impact

<b>Impact degree/ size/ magnitude</b>	<b>Criterion</b>
<b>Positive (high positive):</b>	<i>Revegetation and restoration of areas disturbed by mining and extraction activities until creating new landscapes</i>
<b>Low positive:</b>	<i>Restoring damaged landscapes in sparsely urbanized areas</i>
<b>Very low positive:</b>	<i>Restoring damaged landscapes in urbanized areas</i>
<b>Insignificantly positive:</b>	<i>Restoring damaged landscapes in highly urbanized areas</i>
<b>Without change:</b>	<i>Landscapes are not affected.</i>
<b>Insignificantly negative:</b>	<i>Affecting landscapes in urbanized and sparsely urbanized areas, with no significant change to the existing condition and</i>

<b>Impact degree/ size/ magnitude</b>	<b>Criterion</b>
	<i>low visual impacts. Landscapes may restore without human intervention</i>
<b>Negative (low negative):</b>	<i>Construction of infrastructure sites, facilities and enterprises in urbanized and sparsely urbanized areas with medium visual impacts. Landscapes can be partially restored</i>
<b>High negative:</b>	<i>Construction of facilities, enterprises and infrastructure in landscapes of low human activity impact, protected areas and areas significantly disturbing the existing condition and creating significant negative visual impacts with difficulty or impossibility of restoration</i>
<b>Very high negative:</b>	<i>Construction of open-cast mining sites with auxiliary facilities and infrastructure in all types of landscapes. Complete destruction of landscapes in the area and strong visual impacts. Impossibility of restoring the original state</i>

Table 88 Assessment criteria receptor's sensitivity

<b>Receptor's sensitivity</b>	<b>Regarding the landscape as an assembly of components - rocks, air, waters, plants, animals, soils</b>
<b>Extremely low:</b>	<i>Highly modified and disturbed landscapes from the mining industry - pits, waste piles, heaps, tailings and slag dumps and auxiliary infrastructure</i>
<b>Very low:</b>	<i>Highly anthropogenised landscapes with a broken connection between individual components - industrial areas, production areas, landfills, waste dumps</i>
<b>Low:</b>	<i>Revegetated areas with modified landscapes Settlements and road infrastructure</i>
<b>Average:</b>	<i>Landscapes affected by human activity as a result of intensive long-term agricultural activity. Sustainable agroecosystems of secondary origin</i>
<b>High:</b>	<i>Landscapes affected by human activity, but with preserved connections between individual components. Agricultural areas with alternating natural and semi-natural vegetation and cultivated areas creating characteristic habitats of rare and protected species</i>
<b>Very high:</b>	<i>Landscapes slightly affected by human activity with preserved connections between individual components. Low intensity of agricultural activities, predominant natural vegetation, pastures, grasslands and meadows. Species of conservation importance</i>

<b>Extremely high:</b>	<i>Natural landscapes in protected areas and territories, unaffected by human activity, extremely important for protection of biological diversity or covering unique natural formations, rare, protected and conservation significant species.</i>
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## 4.7. Biological diversity

### 4.7.1. Assessment methodology

The assessment of impacts of project implementation on biodiversity is made in accordance with the current national legislation and the general Methodology for impact assessment adopted for the project, described in details in item 4.1.

Summarized criteria for assessing the negative impact on biodiversity are shown in Table and Table below. In project implementation, no positive impact on biodiversity in the area is expected.

The magnitude/degree of impact is determined based on one or more of the following criteria:

*Spatial scale of an impact;*

*Time scope (duration of impact);*

*Intensity of impact (e.g. noise levels, vibrations, etc.).*

For some impacts, specific quantitative values/parameters cannot be applied. In such cases, assessment is based on expert judgement and on good practice.

Table 90 Assessment criteria of degree/magnitude of negative impact on biodiversity

<b>Impact degree/ size/ magnitude</b>	<b>Biodiversity</b>
<b>Without change</b>	<i>no biodiversity effects are generated in the area</i>
<b>Insignificantly negative:</b>	<ul style="list-style-type: none"> <li>• <i>very small relative area of affected natural habitat / species habitat / short-term impact</i></li> <li>• <i>short-term impact of very low intensity</i></li> </ul>
<b>Negative (low negative)</b>	<ul style="list-style-type: none"> <li>• <i>small relative area of affected natural habitat / habitat of species / short-term impact</i></li> <li>• <i>very small affected area / long-term effect</i></li> <li>• <i>short-term, low-intensity impact</i></li> <li>• <i>long-term impact of very low intensity</i></li> </ul>
<b>High negative</b>	<ul style="list-style-type: none"> <li>• <i>large relative area of affected natural habitat /species habitat/ long-term impact,</i></li> <li>• <i>very large relative area of affected natural habitat / habitat of species / short-term impact</i></li> <li>• <i>high-intensity long-term impact (with specific justification)</i></li> </ul>
<b>Very high negative</b>	<ul style="list-style-type: none"> <li>• <i>very large relative area of affected natural habitat /species habitat/ long-term impact</i></li> <li>• <i>constant high-intensity impact</i></li> </ul>

Receptor sensitivity in this report generally refers to the degree of response of a receptor to a given exposure.

Receptor sensitivity is determined based on one or more of the following criteria:

*Susceptibility to a given impact (e.g. birds are more sensitive to disturbance during the breeding season, reptiles are more sensitive to loss of specimens during winter due to immobilization, etc.);*

*Reproductive/recovery capabilities and period required by the Receptor for recovery; Conservationally important species/habitats are considered to be of higher sensitivity than common ones.*

Table 91 Assessment criteria of receptor's sensitivity - biodiversity

<b>Receptor's sensitivity</b>	<b>In terms of biodiversity</b>
<b>Extremely low</b>	<i>The receptor</i>
<b>Very low</b>	<ul style="list-style-type: none"> <li>• <i>very low susceptibility to a given impact</i></li> <li>• <i>very high self-recovery ability</i></li> </ul>
<b>Low</b>	<ul style="list-style-type: none"> <li>• <i>low susceptibility to a given impact</i></li> <li>• <i>high self-recovery ability</i></li> </ul>
<b>Average</b>	<ul style="list-style-type: none"> <li>• <i>average susceptibility to a given impact</i></li> <li>• <i>average self-recovery ability</i></li> </ul>
<b>High</b>	<ul style="list-style-type: none"> <li>• <i>high susceptibility to a given impact</i></li> <li>• <i>poor self-recovery ability</i></li> </ul>
<b>Very high</b>	<ul style="list-style-type: none"> <li>• <i>very high susceptibility to a given impact</i></li> <li>• <i>very poor self-recovery ability</i></li> </ul>
<b>Extremely high</b>	<ul style="list-style-type: none"> <li>• <i>extremely high susceptibility to a given impact</i></li> <li>• <i>extremely poor self-recoverability</i></li> </ul>

## 4.8. Cultural and historical heritage

### 4.8.1. Assessment methodology

The assessment of the impact resulting from the implementation of the IP on the cultural and historical heritage is in accordance with the current national legislation and the adopted by the project general Impact Assessment Methodology, described in details in item 4.1.

Table 7 and Table 8 below summarise the criteria for assessment of the impact on the cultural and historical heritage resulting from the expansion of the Chiren production site.

Table 7 Assessment criterion degree/size/ magnitude of impact

<b>Impact degree/ size/ magnitude</b>	<b>Criterion</b>
<b>Positive (high positive):</b>	<i>Preventing the destruction of archaeological structures or cultural deposits.</i>
<b>Low positive:</b>	<i>Protecting archaeological structures or cultural deposits.</i>
<b>Very low positive:</b>	<i>Protecting areas with a high concentration of building and domestic pottery with archaeological features</i>

<b>Insignificantly positive:</b>	<i>Protecting areas with a low concentration of building and domestic pottery with archaeological features</i>
<b>Without change:</b>	<i>The envisaged activities are not expected to result in any change to sites of cultural and historical heritage.</i>
<b>Insignificantly negative:</b>	<i>Discovery of a low concentration of building and domestic pottery with archaeological features.</i>
<b>Negative (low negative):</b>	<i>Discovery of a high concentration of building and domestic pottery with archaeological features.</i>
<b>High negative:</b>	<i>Affecting archaeological structures or cultural deposits.</i>
<b>Very high negative:</b>	<i>Destroying archaeological structures or cultural deposits.</i>

Table 8 Assessment criteria receptor's sensitivity

<b>Receptor's sensitivity</b>	<b>In terms of cultural heritage</b>
<b>Extremely low:</b>	<i>Fragments of archaeological or other objects that are in a ruined state, constitute a small part of the authentic integrity of the object, have been substantially defaced, have no significant cultural, scientific or artistic value and can be defined as a mass material.</i>
<b>Very low:</b>	<i>The site has low scientific value.</i>
<b>Low:</b>	<i>The site has limited scientific value.</i>
<b>Average:</b>	<i>Sites frequently encountered which have local cultural value but limited national or international value.</i>
<b>High:</b>	<i>Sites of local or national importance.</i>
<b>Very high:</b>	<i>Sites of local or national importance; protected areas under the CHA; Significant examples of a particular era, style or type.</i>
<b>Extremely high:</b>	<i>Sites of national or global importance (actual or potential) protected by national and international laws or treaties; Sites of outstanding scientific or cultural value - examples of a particular era, historical period, style or type; the most characteristic or rare example of human activity or creativity of the period from which it originated.</i>

## 4.9. Harmful physical factors

### 4.9.1. Assessment methodology

The assessment of the environmental impact of noise and vibration is in accordance with the current national legislation and the general methodology for the assessment of impacts adopted by the project, described in detail in section 4.1. Table 9 and Table 10 below summarises the criteria for the assessment of the environmental impact of the generated noise and vibration. With regard to noise, these criteria are applicable to all noise sensitive areas in the IP area and are used for the purpose of noise impact assessment. As regards to vibration, these criteria apply to sensitive areas whose occupants could be affected by vibration



generated during construction and operation and are applied to assess the expected impacts resulting from the vibration levels emitted.

Table 9 Assessment criterion degree/size/ magnitude of impact

<b>Impact degree/ size/ magnitude</b>	<b>In terms of noise generated in the environment</b>	<b>In terms of vibrations generated in the environment</b>
<b>Positive (high positive):</b>	<i>Reduction of noise levels by more than 10 dB</i>	<i>Reduction of the generated vibrations so as to match the harmonic component values of measured vibrations in the frequency range 50Hz ÷ 80Hz</i>
<b>Low positive:</b>	<i>Reduction of noise levels from 3 dB to 10 dB</i>	<i>Reduction of the generated vibrations so as to match the harmonic component values of measured vibrations in the frequency range 30Hz ÷ 50Hz</i>
<b>Very low positive:</b>	<i>Reduction of noise levels from 1 dB to 3 dB</i>	<i>Reduction of the generated vibrations so as to match the harmonic component values of measured vibrations in the frequency range 10Hz ÷ 30Hz</i>
<b>Insignificantly positive:</b>	<i>Reduction of noise levels by less than 1 dB</i>	<i>Reduction of the generated vibrations so as to match the harmonic component values of measured vibrations in the frequency range 1Hz ÷ 10Hz</i>
<b>Without change:</b>	<i>No quantifiable effects on noise levels are generated or noise levels are not reduced to measurable values</i>	<i>Vibrations are outside the frequency range 1Hz ÷ 80Hz in which the total vibrations affecting humans are normalized</i>
<b>Insignificantly negative:</b>	<i>Reduction of noise levels by less than 1 dB</i>	<i>The values of the harmonic components of the measured vibrations are in the frequency range 1Hz ÷ 10Hz and/or the excited vibrations decay rapidly</i>
<b>Negative (low negative):</b>	<i>1 dB to 3 dB excess noise levels</i>	<i>The values of the harmonic components of the measured vibrations are in the frequency range 10Hz ÷ 30Hz</i>
<b>High negative:</b>	<i>3 dB to 10 dB excess noise levels</i>	<i>The values of the harmonic components of the measured vibrations are in the frequency range 30Hz ÷ 50Hz</i>
<b>Very high negative:</b>	<i>Exceedance of noise levels by more than 10 dB</i>	<i>The values of the harmonic components of the measured vibrations are in the frequency range 50Hz ÷ 80Hz</i>

Table 10 Assessment criteria receptor's sensitivity

<b>Receptor's sensitivity</b>	<b>In terms of noise and vibrations generated in the environment</b>
<b>Extremely low:</b>	<i>Production areas</i>
<b>Very low:</b>	<i>Warehouse areas</i>
<b>Low:</b>	<i>Residential areas subject to impacts of the railway</i>
<b>Average:</b>	<i>Residential areas subject to heavy road traffic</i>
<b>High:</b>	<i>Residential areas and territories</i>
<b>Very high:</b>	<i>Recreation areas and educational facilities</i>
<b>Extremely high:</b>	<i>Medical facilities and sanatoriums</i>

## 4.11. Health and hygiene aspects

### 4.11.1. Assessment methodology

The assessment of the impact of the adverse physical factors of the environment for the health of the population in the vicinity of the construction site and subsequently the production site, as well as on that of the workers on the site, both during construction and operation, is in accordance with the current national legislation and the adopted by the project general Impact Assessment Methodology, described in details in Section 4.1. The tables below summarize the criteria for assessment of impacts on the health of the population and the workers.

Table 11 Assessment criterion degree/size/magnitude of impact

<b>Impact degree/size/ magnitude</b>	<b>In terms of noise generated in the environment</b>
<b>Positive (high positive):</b>	<i>Impacts leading to improved conditions of the surrounding environment and neutralization of pollutants affecting the health status of the population and workers creating a risk of permanent (chronic) damage</i>
<b>Low positive:</b>	<i>Impacts leading to improved conditions of the surrounding environment and neutralization of pollutants affecting the health status of the population and workers, without a risk of permanent (chronic) damage</i>
<b>Very low positive:</b>	<i>Impacts leading to improved conditions of the surrounding environment and neutralization of pollutants resulting in moderate to prolonged irritation, with no risk of affecting the health of the population and workers at the site</i>
<b>Insignificantly positive:</b>	<i>Impacts leading to improvement of the conditions of the surrounding environment and neutralization of pollutants causing short-term irritation</i>

<b>Impact degree/ size/ magnitude</b>	<b>In terms of noise generated in the environment</b>
<b>Without change:</b>	<i>Changes in the surrounding environment are not expected to affect the health of the population and workers on the site</i>
<b>Insignificantly negative:</b>	<i>The changes occurred in the surrounding conditions lead to short-term irritation</i>
<b>Negative (low negative):</b>	<i>The changes occurred in the surrounding conditions may lead to moderate to prolonged irritation, with no risk of affecting the health of the population and workers at the site</i>
<b>High negative:</b>	<i>The changes occurred in the surrounding conditions may affect the health status of the population and workers with no risk of causing permanent (chronic) damage</i>
<b>Very high negative:</b>	<i>The changes occurred in the surrounding conditions may affect the health status of the population and workers causing permanent (chronic) damage</i>

Table12 Assessment criteria receptor's sensitivity

<b>Receptor's sensitivity</b>	<b>In terms of noise and vibrations generated in the environment</b>
<b>Extremely low:</b>	<i>Workers and employees on sites within production areas</i>
<b>Very low:</b>	<i>Workers and employees on sites within warehouse areas</i>
<b>Low:</b>	<i>Population without chronic diseases and currently in good health, living in nearby settlements, subject to systematic disturbances in the environmental conditions</i>
<b>Average:</b>	<i>Population without chronic diseases and currently in good health, living in nearby settlements with excellent environmental conditions</i>
<b>High:</b>	<i>Children, pregnant women and sick people (excluding those with chronic diseases)</i>
<b>Very high:</b>	<i>Chronically ill, currently in good health</i>
<b>Extremely high:</b>	<i>Chronically ill, currently in deteriorated health</i>

## 4.12. Tangible assets

### 4.12.1. Assessment methodology

The assessment of the impacts from the construction and operation on the tangible assets on and near the construction site and subsequently the production site, is in accordance with the current national legislation and the adopted by the project general Impact Assessment Methodology as detailed in item 4.1. Summary criteria for assessing the impact on tangible assets are shown in Table 13 and Table14 below.

Table 13 Assessment criterion degree/size/ magnitude of impact

<b>Impact degree/ size/ magnitude</b>	<b>Criterion</b>
<b>Positive (high positive):</b>	<i>Impacts related to the construction of new facilities and infrastructure sites, which could also be used by the population in the area of the IP and thus have a positive impact on it.</i>
<b>Low positive:</b>	<i>Impacts related to the construction of new facilities and infrastructure sites, irrelevant for the population in the area of the IP</i>
<b>Very low positive:</b>	<i>Impacts resulting in long-term improvement of existing tangible assets in the IP area</i>
<b>Insignificantly positive:</b>	<i>Impacts resulting in temporary improvement of existing tangible assets in the IP area</i>
<b>Without change:</b>	<i>No impact on tangible assets on or near the construction/production site is expected</i>
<b>Insignificantly negative:</b>	<i>Impacts resulting in damage to tangible assets in the area, which damage is fully recoverable in a short time and with a minimal investment. The damage to tangible assets that has occurred does not cause any inconvenience to the population in the vicinity.</i>
<b>Negative (low negative):</b>	<i>Impacts resulting in damage to tangible assets in the area, which damage is fully recoverable, and the recovery process is expected to be longer and require significant investments. The damage to tangible assets that has occurred does not cause any inconvenience to the population in the vicinity.</i>
<b>High negative:</b>	<i>Impacts resulting in damage to tangible assets in the area, which damage is fully recoverable, and the recovery process is expected to be longer and require significant investments. The damage to tangible assets results in significant inconvenience to the population in the vicinity, e.g. disruption of power and water supplies, road connections, etc.</i>
<b>Very high negative:</b>	<i>Impacts resulting in irreversible damage to tangible assets, the only remediation of which is related to the construction of new facilities and the damage of which causes inconvenience to the population in the area of the investment proposal - e.g. damage to the power supply, which requires the construction of an entirely new and newly-routed electricity network; damage to access roads, which requires the approval of a new route and the construction of brand new road connections, etc.</i>

Table14 Assessment criteria receptor's sensitivity

<b>Receptor's sensitivity</b>	<b>In terms of tangible assets</b>
<b>Extremely low:</b>	<i>Damaged and currently non-functioning facilities and infrastructure sites</i>
<b>Very low:</b>	<i>Damaged but currently functioning facilities and infrastructure sites</i>
<b>Low:</b>	<i>Facilities and infrastructure sites where damage has occurred but it does not pose a risk to their normal functioning and the damage repair is irrelevant</i>
<b>Average:</b>	<i>Facilities and infrastructure sites that are not currently damaged but are obsolete and their normal functioning requires replacement</i>
<b>High:</b>	<i>Modern facilities and infrastructure sites in good material and technical condition</i>
<b>Very high:</b>	<i>Modern facilities and infrastructure sites in good material and technical condition, relevant to the normal life of the population in the vicinity of the IP, such as water and electricity networks, road connections, etc.</i>
<b>Extremely high:</b>	<i>Newly built facilities and infrastructure sites, relevant to the normal life of the population in the vicinity, such as water and electricity networks, road connections, etc.</i>

### **17. Item 4.2.2.3 of the EIA Report.**

#### 4.2.2.3. Methodology for calculation of annual amounts of pollutants in ambient air - NO<sub>x</sub>, SO<sub>2</sub>, CO

The calculation formula is specified in item 4.2.2.3 of the EIA Report.

Calculation formula:

$$E(kg) = D * T * C_0 * 10^{-6},$$

where:

D (Nm<sup>3</sup>/h) is the quantity of waste gases taken from the ambient air emission monitoring protocol,

T (h) is the operating hours during the year, taken from an annual log,

C<sub>0</sub> (mg/Nm<sup>3</sup>) is the emission adjusted to normal conditions taken from the ambient air emission monitoring protocol,

10<sup>-6</sup> – conversion factor - from mg → kg

### **18. Table 3 and Table 4 of the EIA Report.**

Table 15 Quantity of waste water

<b>Building</b>	<b>Qmax l/s</b>
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<b>Ethnological energy building</b>	2,73
<b>Entrance</b>	0,87
<b>Electric building 1</b>	0.50
<b>Electric building 2</b>	0.50
<b>Electric building 3</b>	0.50
<b>Electric building</b>	0.50

Table 16 Basic raw materials and materials during construction.

<b>Вид</b>	<b>Забележка</b>
Crushed stone	crushed stone will be used for paving the construction site and will be supplied from nearby quarries in the construction area.
Sand	from nearby bases
Gravel	from nearby bases
Water	from the existing water supply network at the site of the UGS "Chiren"
Concrete	from the concrete units located in the area

### 19. Table 5 and Table 6 of the EIA Report.

Table 17 Construction machinery with diesel engines.

<b>Technical parameters</b>	<b>Power HP (horsepower) or kW</b>	<b>Quantity</b>	<b>Working hours</b>	<b>Planned working days during the construction period</b>
Bulldozer	201 HP	3	8	20
Excavator - hydraulic	170 HP	4	8	150
Wheel loader	153 HP	1	8	102
Electric generators	66 kW	2	8	250

Table 18 Transport equipment with diesel engines.

<b>Activity</b>	<b>Type</b>	<b>Power HP (horsepower) or kW</b>	<b>Courses per day</b>
-----------------	-------------	------------------------------------	------------------------

Ground mass export	Dump truck	420 HP	6
Delivery of necessary raw materials and materials	Dump truck	420 HP	4
Delivery of the elements for the station	Trailer	510 HP	1

**20. Table 7 and Table 8 of the EIA Report.**

Table 19 Transport scheme during operation

Activity	Type	Power HP (horsepower) or kW	Courses per month
Delivery of necessary raw materials, materials and elements for the station	Heavy duty trucks	420 HP	2 per month if needed
Transportation of workers	-	-	-
Personal cars of the staff	-	-	-

Table 8 Waste expected to be generated during construction

Waste Group/Code	Type of waste	Quantity, t/m <sup>3</sup>
12 01 Wastes from moulding, physical and mechanical surface treatment of metals and plastics		
12 01 13	Welding waste	0.15
12 01 21	Spent grinding bodies and grinding materials, other than those mentioned in 12 01 20*	0.03
15 01 Packaging (including separately collected household waste packaging)		
15 01 01	Paper and cardboard packaging	0.6
15 01 02	Plastic packaging	0.5
15 01 03	Wood packaging	0.9
15 01 04	Metal packaging	0.6
15 01 06	Mixed packaging	0.5
15 01 07	Glass packaging	0.3
15 01 10*	Packaging containing residues of hazardous substances or contaminated with hazardous substances	0.6
15 02 Absorbents, filter materials, wipes and protective clothing		

Waste Group/Code	Type of waste	Quantity, t/m <sup>3</sup>
15 02 02*	Absorbents, filter materials (including oil filters not specified elsewhere), wiping cloths and protective clothing contaminated with hazardous substances (oils)	Under 1.0
15 02 03	Absorbents, filter materials, wipes and protective clothing other than those mentioned in 15 02 02	Under 1.0
17 01 Concrete, bricks, roof tiles, tiles, porcelain and ceramic products		
17 01 01	Concrete	5.0
17 01 07	Mixtures of concrete, bricks, roof tiles, tiles, faience and ceramic products other than those mentioned in 17 01 06	1.7
17 02 Wood, glass and plastic		
17 02 01	Wood material	5.5
17 02 03	Plastic	0.8
17 04 Metals (including their alloys)		
17 04 05	Cast iron and steel	4.0
17 05 Soil (including excavated soil from contaminated places), stones and excavated earth masses		
17 05 04	Soil and stones other than those mentioned in 17 05 03	8000 m <sup>3</sup>
17 06 Insulating materials and asbestos-containing construction materials		
17 06 04	Insulating materials other than those mentioned in 170601 and 170603	0.3
17 09 Other construction and demolition waste		
17 09 04	<i>Mixed construction and demolition waste, other than those mentioned in 17 09 01, 17 09 02 and 17 09 03</i>	1.0
20 03 01 - Other household waste		
20 03 01	Mixed household waste	3.5

## 21. Item 4.4.2 and the Assessment

Identification of impacts

Impact during the construction works

The negative impacts on soils are mainly concentrated in the construction phase of the compressor station, the gatherings, the connection to the flare and the adjacent infrastructure.

For the construction of the site of the compressor station and the road connections, construction activities are planned, including:



- Removal of humus layer and excavation of lower soil horizons for the foundations of buildings and facilities
- Covering part of the site with impermeable pavements (concreting) for placing the facilities, infrastructure and buildings;
- Building a fence;
- Construction of road links through excavation/filling works and installation of permanent pavement.

Impact on soils is expressed in:

- Temporary disturbance within the easement of the gatherings, the water supply line and the sewerage lines, the formation water and condensate pipelines, and the connection to the flare;
- Partial destruction and damage within the compressor station site. Sealing and destruction of soil profile during construction (after removal of humus layer);
- Damage to or destruction within the extent of the road connections proposed to be constructed. Compaction of soils by construction machinery within designated areas;
- Potential local contamination of soils during construction from unforeseen spills of lubricants, fuel and waste.

Impact during operation

During exploitation no impacts are expected to effect the soils beyond the limits of the compressor station.

Local contamination of soils on site with petroleum products from accidents or with household and construction waste from activities related with the maintenance of the buildings and the facilities is possible.

## **22. Table 9 and Table 10 of the EIA Report.**

Table 20 Waste expected to be generated during the operation

<b>Waste Group/Code</b>	<b>Name of the waste</b>	<b>Quantity, t/y</b>
<b>12 01 Wastes from moulding, physical and mechanical surface treatment of metals and plastics</b>		
12 01 01	Sawdust, shavings and scraps of ferrous metals	0.275
<b>13 02 Used motor, lubricating and gear oils</b>		
13 02 05*	Mineral-based non-chlorinated engine, lubricating and gear oils	18
<b>13 05 Waste from oil-water separation</b>		
13 05 01*	Solid residues from sand collectors and oil-water separators	0.510
13 05 03*	Sludge from oil catch shafts	15

Waste Group/Code	Name of the waste	Quantity, t/y
<b>15 02 Absorbents, filter materials, wipes and protective clothing</b>		
15 02 02*	Absorbents, filter materials (including oil filters not specified elsewhere), wiping cloths and protective clothing contaminated with hazardous substances (oils)	0.600
15 02 03	Absorbents, filter materials, wipes and protective clothing other than those mentioned in 15 02 02	0.400
<b>16 01 End-of-life vehicles of various types of transport (including off-road equipment) and waste from disassembly of end-of-life vehicles and repair and maintenance parts (except for 13, 14, 16 06 and 16 08)</b>		
16 01 03	End-of-life tyres	2.0
16 01 04*	End-of-life transport vehicles	22.0
16 01 18	Non-ferrous metals	0.510
<b>16 02 Waste of electrical and electronic equipment</b>		
16 02 13*	End-of-life equipment containing hazardous components (3) other than those mentioned in codes from 16 02 09 to 16 02 12	1.77
16 02 14	End-of-life equipment other than those mentioned in codes from 16 02 09 to 16 02 13	0.385
<b>16 03 Rejected batches and unused materials</b>		
16 03 05*	Organic waste containing hazardous substances - spent triethylene glycol (TEG) from a natural gas dehydration plant	47
	End-of-life foaming agent	1.05
<b>16 06 Batteries and accumulators</b>		
16 06 01*	Lead acid batteries	1.35
16 06 02*	Ni-Cd batteries	0.015
<b>16 07 Wastes from cleaning transport tanks, storage tanks and drums (except 05 and 13)</b>		
16 07 08*	Waste containing oils and petroleum products	16.0
<b>17 01 Concrete, bricks, roof tiles, tiles, ceramic products</b>		
17 01 07	Mixtures of concrete, bricks, roof tiles, tiles, and ceramic products other than those mentioned in 17 01 06	9.0
<b>17 04 Metals (including their alloys)</b>		
17 04 05	Cast iron and steel	55.0
<b>19 09 Waste from preliminary treatment of drinking water or water for industrial purposes</b>		
19 09 05	Saturated or spent ion exchange resins	2.2

Waste Group/Code	Name of the waste	Quantity, t/y
<b>20 01 Separately collected fractions (except 15 01)</b>		
20 01 21*	Fluorescent tubes and other waste containing mercury	0.08
20 01 39	Plastic	2.5
<b>20 03 01 - Other household waste</b>		
20 03 01	Mixed household waste	14.0
20 03 04	Septic tank sludge	7.0

Table 21 Temporary storage of waste generated during operation

Type of waste		Type of point	Storage tanks	Capacity/maximum allowed quantity	Information board	Distance to the closest building	Absorbent
Code	Name						
12 01 01	Sawdust, shavings and scraps of ferrous metals	2 metal containers "open pallet" type, with a total useful volume of up to 1 t each in front of the Welding and Repair Workshop	no	total useful volume up to 1 t each container and occupied area 0.5 m <sup>2</sup> for each container	yes	Immediately next to the Welding and Repair Workshop	N/A
13 02 05*	Mineral-based non-chlorinated engine, lubricating and gear oils	Metal cylindrical, lying, horizontal tank, with a volume of 4m <sup>3</sup> in the open storage for oils;	yes	Metal cylindrical, lying, horizontal tank, with a volume of 4m <sup>3</sup> in the open storage for oils; the oils ТП32 are stored in the GTCU and are delivered directly	yes	7 – 10 m GTCU – 12 m	yes
13 05 01*	Solid residues from sand collectors and oil-water separators	One special metal container with opening lid, "Profi" type	no	The reservoir volume is 1 m <sup>3</sup> .	yes	80 - m	no

Type of waste		Type of point	Storage tanks	Capacity/maximum allowed quantity	Information board	Distance to the closest building	Absorbent
Code	Name						
13 05 03*	Sludge from oil catch shafts	One special metal container; buried cistern to the natural gas filter with a volume of 6.8 m <sup>3</sup> and the gathering tank of oil-mud collector - 4 m <sup>3</sup> to the compressor workshop, as well as the collection chamber of the oil-mud collector to the car wash, also buried	no	One special metal container with a capacity of 5 m <sup>3</sup> , located on an open air site at oil-mud collector- P15. The container is made of individual metal cells each with a volume of 1 m <sup>3</sup> , with a metal lid. Formed sludge is stored in the facilities themselves.	yes	15 - m	yes
15 02 02*	Absorbents, filter materials (including oil filters not elsewhere specified), wiping cloths, protective clothing contaminated with hazardous substances	4 metal drums	no	Capacity of each drum 200 l	yes	In the building of the transport vehicles	yes
15 02 03	Absorbents, filter materials, wipes and protective clothing other than those mentioned in 15 02 02	Plastic container, capacity 240 l.	no	240l	yes	In warehouse 4	no

Type of waste		Type of point	Storage tanks	Capacity/maximum allowed quantity	Information board	Distance to the closest building	Absorbent
Code	Name						
16 01 03	End-of-life tyres	Covered warehouse in the transport vehicles building	no	Up to 200 tyres	yes	In the building of the transport vehicles	no
16 01 04*	End-of-life transport vehicles	Storing site next to the garages	no	94 m <sup>2</sup> or up to 5 end-of-life motor vehicles	yes	Next to the garages	yes
16 01 18	Non-ferrous metals	One special metal container	no	1 metal container type "open pallet" with a total volume of up to 1 t. Busy area of about 0,5 m <sup>2</sup>	yes	Covered warehouse 4	no
16 02 13*	End-of-life equipment containing hazardous components (3) other than those mentioned in codes from 16 02 09 to 16 02 12	3 metal containers type "open pallet" If necessary, cartons or the original packaging of the equipment are used	no	3 metal containers of the "open pallet" type, with a volume of up to 1 t each	yes	In a covered warehouse 4	yes
16 02 14	End-of-life equipment other than those mentioned in codes from 16 02 09 to 16 02 13	Racks or metal container, as well as original packaging	no	2 m <sup>2</sup>	yes	In a covered warehouse 4	no
16 03 05*	Organic wastes containing hazardous substances	Cylindrical, horizontal cistern in the designated open storage area	yes	16 m <sup>3</sup>	yes	20 m	yes
16 03 05*	Organic wastes containing hazardous substances	Original packaging - barrels or cans	no	3.4 m <sup>2</sup>	yes	In a covered warehouse 4	yes
16 06 01*	Lead acid batteries	Special metal container	no	Special metal container with a volume of 1	yes	in the motor vehicle's	yes

Type of waste		Type of point	Storage tanks	Capacity/maximum allowed quantity	Information board	Distance to the closest building	Absorbent
Code	Name						
		with a volume of 1 m <sup>3</sup> with a metal lid and 1 "pallet" type containers without a lid with a volume of 0.4 m <sup>3</sup> up to 1 t		m <sup>3</sup> with a metal lid and 1 "pallet" type containers without a lid with a volume of 0.4 m <sup>3</sup> up to 1 t		battery building (indoor area)	
16 06 02*	Ni-Cd batteries	Sacks or cartons	no	0.2 m <sup>2</sup>	yes	in the motor vehicle's battery building (indoor area)	yes
16 07 08*	Waste containing oils and petroleum products	At the place of formation – reservoirs for oils, petroleum products and gas condensate	yes	-	yes	At the place of formation	yes
17 01 07	Mixtures of concrete, bricks, roof tiles, tiles, and ceramic products other than those mentioned in 17 01 06	Outdoor area at the cooling towers	no	84 m <sup>2</sup>	yes	75 m	no
17 04 05	Cast iron and steel	Outdoor area at the cooling towers	no	250t	yes	83 m	no
19 09 05	Saturated or spent ion exchange resins	1 "pallet" type containers without a lid	no	Total volume 0,4 m <sup>3</sup> up to 1 t	yes	In a covered warehouse 4	no

Type of waste		Type of point	Storage tanks	Capacity/maximum allowed quantity	Information board	Distance to the closest building	Absorbent
Code	Name						
20 01 21*	Fluorescent tubes and other waste containing mercury	Original packaging and boxes	no	5 m <sup>2</sup>	yes	In a covered warehouse 4	yes
20 01 39	Plastic	1 "pallet" type containers without a lid	no	Total volume of container up to 0,5 m <sup>3</sup> and up to 1 t	yes	In a covered warehouse 4	no
20 03 04	Septic tank sludge	At the place of formation	no	Capacity of septic tank - 40 m <sup>3</sup>	yes	10 m	no
20 03 01	Mixed household waste	Hard household waste containers, Bobar type – 1, 11 buckets	no	0,11 m <sup>3</sup> each bucket and 1,1 m <sup>3</sup> each Bobar container	yes	Immediately next to the buildings	no

## 23. Table 11 and Table 12 of the EIA Report.

Table 22 Parameters of discharge devices located on both sites of Chiren UGS

DD	Height	Diameter	Temperature Exhaust gases	Flowrate of flue-gases	Working hours In year	Pollutant	Norms of Permissible emissions (NPE)	Emissions (average yearly/ maximum)		
								g/s		
	m	m	°C	Nm <sup>3</sup> /h	h	type	mg/Nm <sup>3</sup>	SO <sub>x</sub>	NO <sub>x</sub>	CO
<b>Existing site</b>										
Gas motor compressors (GMCs) type -10 ГKHAM - No. 1÷8	11.5	0.35	320	5100	4320	NO <sub>x</sub>	1905	-	0.1327 / 0.2692	-
Triethylene glycol regeneration unit (TEG) - No. 1	11	0.30	250	880	3600	SO <sub>x</sub> NO <sub>x</sub> CO	35 250 1000	0.0035 / 0.0086	0.0251 / 0.0611	0.0100 / 0.0244
Water heating boilers BUDERUS, type G 605-740/12 - No. 1÷3	10	0.30	125	520	3600	SO <sub>x</sub> NO <sub>x</sub> CO	35 250 1000	0.0021 / 0.0051	0.0148 / 0.0361	0.0059 / 0.0144
<b>New site</b>										
Gas turbine compressor units (GTCUs) No. 1÷4	14	1.9	510	86,558	4320	NO <sub>x</sub>	50	-	0.5929 / 1.2022	-
Triethylene glycol regeneration plant (TEG) No. 1÷2	8	0.3	220	800	3600	SO <sub>x</sub> NO <sub>x</sub> CO	35 250 100	0.0032 / 0.0078	0.0228 / 0.0556	0.0091 / 0.0222
Natural gas boilers - No.1÷5	8	0.63	550	5,000	3600	NO <sub>x</sub>	100	-	0.0571 / 0.1389	-

Table 23 Balance of earth masses

Soil type	Hummus /0.50/	Earth mass				
		m <sup>3</sup>				
Equipment:	Activity:	<i>cleaning</i>	<i>vertical layout</i>	<i>excavation</i>	<i>backfill =</i>	<i>further quantities</i>
<b>Gas gatherings</b>		36,550		26,697	26,233	235

5 The specified norm is in force as of 1.01.2030, and until the provisions of the medium-sized combustion Ordinance come into force, the emissions generated by GMCs are not regulated, due to the fact that in ORDINANCE No. 1 of 27.06.2005 on norms for permissible emissions of harmful substances (pollutants) released into the atmosphere from sites and activities with stationary sources of emissions, no norm has been determined for GMCs and the 1999 Protocol. to the 1979 Convention on Long-Range Transboundary Air Pollution to Abate Acidification, Eutrophication and Tropospheric Ozone (Ratified by Act of the 39th National Assembly of 20.04.2005 – OJ, 38 of 3.05.2005, published, OJ 93 of 22.11.2005, in force in the Republic of Bulgaria as of 3.10.2005, amended OJ 87 of 5 November 2019) no norms for GMCs have been determined.



<b>Water pipeline</b>	250		215	104	22
<b>Sewerage</b>	265		427	196	84
<b>Anode earthing devices (AED)</b>	671		219	192	27
<b>Road/off site/</b>	700		65	340	1,250
<b>A platform under the compressors and buildings</b>	33,225	32,944	13,550	6,950	5,700
<b>Flare</b>	5,000		5,000	5,000	
<b>TOTAL</b>	<b>109,605</b>		<b>92,504</b>		

## 24. Table 13 and Table 14 of the EIS Report.

Table 24 Dust emissions during construction (tons)

Activities	Emissions, t		
	Dust	PM <sub>10</sub>	PM <sub>2.5</sub>
Bulldozing	32.48	15.80	4.83
Handling of bulk materials (removal and loading)	7.28	3.54	1.08
Movement of the dump trucks to heap disposal area/dumping ground	5.70	1.74	0.25
Wind erosion	10.98	5.50	2.20
<b>TOTAL</b>	<b>56.43</b>	<b>26.58</b>	<b>8.36</b>

Table 25 Emissions from an area source (construction machinery)

Greenhouse gases			Major and specific pollutants					
t/km								
CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	NO <sub>x</sub>	SO <sub>2</sub>	CO	NM VOC	PM <sub>10</sub> *	NH <sub>3</sub>
849.40	0.052	0.363	3.76	0.027	5.19	0.6	0.26	0.002

## 25. Item 4.7.4.1.1 of the EIA Report.

### 4.7.4.1.1. Impact during construction

A range of mammal species, both common (mass) and of conservation importance, may occur in open habitats (including farmland). Mass species are those whose populations are not currently threatened. These are species with relatively high densities and high reproductive potential which allows them to recover rapidly. These species are mobile and can avoid the impact area without having a significant impact on them. Mass species that could potentially occur in the IP area are mole (*Talpa europaea*), field vole (*Microtus arvalis*), Eastern European vole (*Microtus rossiaemeridionalis*), subterranean vole (*Microtus subterraneus*), field mouse (*Apodemus agrarius*), wild hare (*Lepus capensis*), fox (*Vulpes vulpes*), black ferret (*Mustela putorius*), etc. The potential impacts for these species include habitat loss, loss of individuals and disturbance. Individuals may be affected, but this is not expected to affect the status of their populations in the area of impact. Their sensitivity is assessed as low. The IP will be implemented within a

relatively small territory, in agricultural land, mostly arable in an area with large areas of similar habitat. The magnitude of impact is low. No significant impacts on populations of mass mammal species are expected in the IP area.

Conservation-relevant mammal species, potentially occurring on agricultural land and inhabiting the area are *Spermophilus citellus* and *Vormela peregusna*. Potential impacts on them are:

#### Loss/damage of habitat

Loss of habitats will occur in the area directly affected by the construction activities. The IP will be implemented in arable land, which is a potential but not optimal habitat for both species. The majority of the affected area is vineyard (56.63 dka) and field (21.13 dka). The pasture that is a potential habitat for both species is 4.48 dka and adjacent to the main, existing site.

The impact in the pasture will be permanent but will affect a small area in sub-optimal habitat. There are large areas of this type of habitats in the area. This will allow mammals potentially inhabiting the affected area to move into the adjacent area. The magnitude of the impact is assessed as low. The sensitivity of the species to this impact is high during the breeding and hibernation seasons (for *Spermophilus citellus*) and low outside these seasons. Its significance can be assessed as low during periods of high sensitivity and negligible during the rest of the year.

#### Loss of individuals

There is a possible loss of individuals as a result of the excavation activities, machinery movement, etc. The affected part of the potential habitat is very small. It is located adjacent to the active site, making it sub-optimal habitat due to existing disturbance. The number of individuals that could be killed or injured during construction is minimal and could be as a result of an accident. Sensitivity is rated as high during the breeding season and during hibernation (for the *Spermophilus citellus*). Sensitivity is moderate during the rest of the year. The significance can be assessed as low during periods of high sensitivity and negligible during the rest of the year.

#### Disturbance

Disturbance may occur as a result of the presence and operation of people and equipment on the construction site. The area affected would be larger than that directly affected, but would also be relatively small. The impact is temporary, short-term and expected only during the construction activities. The sensitivity of animals is high during the breeding season (for *Spermophilus citellus* and during hibernation) and low during the rest of the year. The magnitude of negative impact is low. The significance of the disturbance is assessed as low during periods of high sensitivity and negligible during the rest of the year.

### **26. item 4.8.1 of the EIA Report.**

### 4.8.1. Assessment methodology

The assessment of the impact resulting from the implementation of the IP on the cultural and historical heritage is in accordance with the current national legislation and the adopted by the project general Impact Assessment Methodology, described in details in item 4.1.

Table 7 and Table 8 below summarise the criteria for assessment of the impact on the cultural and historical heritage resulting from the expansion of the Chiren production site.

Table 26 Assessment criterion degree/size/ magnitude of impact

Impact degree/ size/ magnitude	Criterion
<b>Positive (high positive):</b>	<i>Preventing the destruction of archaeological structures or cultural deposits.</i>
<b>Low positive:</b>	<i>Protecting archaeological structures or cultural deposits.</i>
<b>Very low positive:</b>	<i>Protecting areas with a high concentration of building and domestic pottery with archaeological features</i>
<b>Insignificantly positive:</b>	<i>Protecting areas with a low concentration of building and domestic pottery with archaeological features</i>
<b>Without change:</b>	<i>The envisaged activities are not expected to result in any change to sites of cultural and historical heritage.</i>
<b>Insignificantly negative:</b>	<i>Discovery of a low concentration of building and domestic pottery with archaeological features.</i>
<b>Negative (low negative):</b>	<i>Discovery of a high concentration of building and domestic pottery with archaeological features.</i>
<b>High negative:</b>	<i>Affecting archaeological structures or cultural deposits.</i>
<b>Very high negative:</b>	<i>Destroying archaeological structures or cultural deposits.</i>

Table 27 Assessment criteria receptor's sensitivity

Receptor's sensitivity	In terms of cultural heritage
<b>Extremely low:</b>	<i>Fragments of archaeological or other objects that are in a ruined state, constitute a small part of the authentic integrity of the object, have been substantially defaced, have no significant cultural, scientific or artistic value and can be defined as a mass material.</i>
<b>Very low:</b>	<i>The site has low scientific value.</i>

Receptor's sensitivity	In terms of cultural heritage
<b>Low:</b>	<i>The site has limited scientific value.</i>
<b>Average:</b>	<i>Sites frequently encountered which have local cultural value but limited national or international value.</i>
<b>High:</b>	<i>Sites of local or national importance.</i>
<b>Very high:</b>	<i>Sites of local or national importance; protected areas under the CHA; Significant examples of a particular era, style or type.</i>
<b>Extremely high:</b>	<i>Sites of national or global importance (actual or potential) protected by national and international laws or treaties; Sites of outstanding scientific or cultural value - examples of a particular era, historical period, style or type; the most characteristic or rare example of human activity or creativity of the period from which it originated.</i>

**27. item 4.9.1 of the EIA Report.**

**4.9.1. Assessment methodology**

The assessment of the environmental impact of noise and vibration is in accordance with the current national legislation and the general methodology for the assessment of impacts adopted by the project, described in detail in section 4.1. Table 9 and Table 10 below summarises the criteria for the assessment of the environmental impact of the generated noise and vibration. With regard to noise, these criteria are applicable to all noise sensitive areas in the IP area and are used for the purpose of noise impact assessment. As regards to vibration, these criteria apply to sensitive areas whose occupants could be affected by vibration generated during construction and operation and are applied to assess the expected impacts resulting from the vibration levels emitted.

Table 28 Assessment criterion degree/size/ magnitude of impact

Impact degree/ size/ magnitude	In terms of noise generated in the environment	In terms of vibrations generated in the environment
<b>Positive (high positive):</b>	<i>Reduction of noise levels by more than 10 dB</i>	<i>Reduction of the generated vibrations so as to match the harmonic component values of measured vibrations in the frequency range 50Hz ÷ 80Hz</i>
<b>Low positive:</b>	<i>Reduction of noise levels from 3 dB to 10 dB</i>	<i>Reduction of the generated vibrations so as to match the harmonic component values of measured vibrations in the frequency range 30Hz ÷ 50Hz</i>

<b>Impact degree/ size/ magnitude</b>	<b>In terms of noise generated in the environment</b>	<b>In terms of vibrations generated in the environment</b>
<b>Very low positive:</b>	<i>Reduction of noise levels from 1 dB to 3 dB</i>	<i>Reduction of the generated vibrations so as to match the harmonic component values of measured vibrations in the frequency range 10Hz ÷ 30Hz</i>
<b>Insignificantly positive:</b>	<i>Reduction of noise levels by less than 1 dB</i>	<i>Reduction of the generated vibrations so as to match the harmonic component values of measured vibrations in the frequency range 1Hz ÷ 10Hz</i>
<b>Without change:</b>	<i>No quantifiable effects on noise levels are generated or noise levels are not reduced to measurable values</i>	<i>Vibrations are outside the frequency range 1Hz ÷ 80Hz in which the total vibrations affecting humans are normalized</i>
<b>Insignificantly negative:</b>	<i>Reduction of noise levels by less than 1 dB</i>	<i>The values of the harmonic components of the measured vibrations are in the frequency range 1Hz ÷ 10Hz and/or the excited vibrations decay rapidly</i>
<b>Negative (low negative):</b>	<i>1 dB to 3 dB excess noise levels</i>	<i>The values of the harmonic components of the measured vibrations are in the frequency range 10Hz ÷ 30Hz</i>
<b>High negative:</b>	<i>3 dB to 10 dB excess noise levels</i>	<i>The values of the harmonic components of the measured vibrations are in the frequency range 30Hz ÷ 50Hz</i>
<b>Very high negative:</b>	<i>Exceedance of noise levels by more than 10 dB</i>	<i>The values of the harmonic components of the measured vibrations are in the frequency range 50Hz ÷ 80Hz</i>

Table 29 Assessment criteria receptor's sensitivity

<b>Receptor's sensitivity</b>	<b>In terms of noise and vibrations generated in the environment</b>
<b>Extremely low:</b>	<i>Production areas</i>
<b>Very low:</b>	<i>Warehouse areas</i>
<b>Low:</b>	<i>Residential areas subject to impacts of the railway</i>
<b>Average:</b>	<i>Residential areas subject to heavy road traffic</i>
<b>High:</b>	<i>Residential areas and territories</i>

Receptor's sensitivity	In terms of noise and vibrations generated in the environment
Very high:	<i>Recreation areas and educational facilities</i>
Extremely high:	<i>Medical facilities and sanatoriums</i>

## 28. Item 1.3.3 of the present EIA Report.

### 1.3.3. Infrastructure connections

#### 1.3.3.1. Road connections

Three access roads will be constructed to the site: a new road connection from asphalt road Chiren - Devene to the newly designed CS and the storage site /road connection 1/, of 6.0 m width and about 118.0 m length with asphalt pavement, and the other two access roads will begin from the existing site of Chiren UGS to the new compressor station. The construction of the new road connection requires an area of about 1.8 decares, for which a procedure for real rights acquisition will be carried out. Such road connection concerns the lands belonging to the village of Chiren, Vratsa Municipality.

In order to provide road access to the technological site for flare system at Chiren UGS and for fire protection needs, the construction of a durable pavement of crushed stone on an existing field road with identifier 81400.1.565 is planned. The width of the pavement is 3.50 m, it will be executed at the level of the existing terrain - with one-sided transverse slope.

Drainage of road pavements from surface water will be done superficially, along the slopes of the pavement, towards the existing terrain. In the excavated sections, a lined safety drainage ditch is provided along the newly designed road link, which will divert surface water away from the reach of the road.

#### 1.3.3.2. Gas pipeline branches, pipelines and gatherings to CS Chiren UGS

The following gas pipeline branches, gas pipelines and gatherings will be designed in the lands belonging to the village of Chiren:

- A gas pipeline branch connecting the existing gas pipeline Vratsa 1 to the newly designed Compressor station with a length of about 266 m and a diameter of DN 500 mm;
- A gas pipeline branch connecting the existing gas pipeline Vratsa 2 to the newly designed Compressor station with a length of 35 m and a diameter of DN 500 mm;
- Gas pipeline connection between the new site and the site of the new flare with a length of 160 m, consisting of pipelines for - fuel gas (DN25), instrumentation air (DN25), natural gas released from the facilities with a diameter of DN250;
- Gatherings (28 gatherings) connecting the site of the CS to the existing ones of the exploitation wells with lengths varying from 400 – 500 m and a diameter of DN 150 mm;

- Displacement of the route of an existing gas gathering to Well 28, running through the territory of the new technological site to the CS with a length of 620 m and a diameter DN 150 mm;
- Displacement of the route of an existing gas gathering to Well 23, running through the territory of the new technological site to the CS with a length of 180 m and a diameter DN 150 mm;
- Displacement of the route of an existing gas pipeline Nivego with a length of about 840 m and diameter DN 50 mm, owned by Nivego OOD;
- Drainage condensate pipeline with a length of about 845m and a diameter of DN 100 mm between the new site and the fiscal warehouse located in land property with identifier 81400.37.179;
- Formation water pipeline with lengths of about 350 m and DN 100 mm, which will exit the new site to the existing one of Chiren UGS.

According to pipes' diameter and Ordinance No. 16 of 09.06.2004 for the easements of energy sites, a 30 m easement zone is set up, 15 m each on both sides of the newly designed gas pipeline branches for connection with gas pipelines Vratsa 1 and Vratsa 2 and flare system. Gas pipelines for condensate and formation water fall within the existing easement of the well gatherings. The new connections to the wells (gas gatherings) will be located in parallel and an easement zone with a width of 5 m parallel to the axis of the final gas pipelines will be established for them (gatherings). For the displaced routes of the gatherings to Wells 23 and 28 and the displaced route of the Nivego gas pipeline an easement will be established of 12 m, 6 m on both sides of the axis.

The pipelines and gas gatherings will be laid underground at a depth of min 1.0 m, measured from the upper part of the pipe according to the requirements of the Ordinance on the design and safe operation of transmission and distribution gas pipelines and on the facilities, installations and equipment for natural gas.

In this zone the following are not allowed: any type of construction, soil cultivation (plowing) of the soil at a depth greater than 0.5m, as well as lighting a fire, planting perennial tree plantations, carrying out drilling works, exploration and production of underground natural resources, parking of all types of vehicles, storage of waste and materials, actions of third parties on facilities of the energy sites, etc.

#### 1.3.3.3. Branch from an existing water supply pipeline to Chiren UGS

A new water supply branch is planned to be constructed for water supply of the expansion of Chiren UGS site. It will be supplied by the existing water supply system to Chiren UGS. It is intended to supply buildings and facilities at compressor station site with potable and household water. The water pipeline will have a diameter of 150 mm and a length of 86 m. An easement zone of 6.0m (3.0m on both sides along the axis of the pipe) is envisaged, where construction and permanent crops are not allowed.

#### 1.3.3.4. Rainwater drainage from Chiren UGS

The route of the newly designed off-site rainwater drainage, draining rainwater from the site, is envisaged to be 90m long and to be discharged together with the mixed waste water into a dry gully in Lakite area in the village of Chiren, according to Permit for waste water discharge into surface water bodies №13140017/14.06.2007. An easement zone of 6.0 m (3.0 m on both sides along pipe axis) is envisaged, where construction and permanent crops are not allowed.

Rain waters from the site will meet the requirements for discharge into surface water bodies. According to the issued discharge permit, the discharge point is at the outlet sewer collector Flow 1 with geographical coordinates B=43°20'59,9" и L=23°35'24,8" (N = 43.349972, E = 23.590222).

#### 1.3.3.5. Technological site for flare system

A new technological site for a flare system used for gas burning is planned to be constructed. The gas released manually by the various systems and devices during repair activities and normal operation will enter the flare system through a gas pipeline.

The flare system will be used to burn natural gas from:

- Purging of technological lines;
- Pressure release (manually);

All emergency and automatic release will be carried out by vents. The amount of gas to maintain the flame for combustion will be about 10 Nm<sup>3</sup>/h in both UGS operation modes (withdrawal and injection).

The technological site for the flare system will be 100/100 m.

#### 1.3.3.6. Anode grounding devices

Regarding the electrochemical protection of all underground steel pipelines (gatherings to the drilling wells), routes of anode grounding conductors outside the technological site are planned to be constructed. The routes will be located east and west of the site. They will pass through the land of the village of Chiren,

The route to the east is about 270 m long, and the route to the west 95 m. An easement zone of 4.0 m (2.0 m on both sides along the axis of the cable) is envisaged for the routes, where construction works and permanent crops cultivation are not allowed.

### **29. Table 15 and Table 16 of the EIA Report.**

Fuel evaporative emissions are not included (NFR Code 1.A.3.b.v), but particulate emissions from tire and brake wear (NFR Code 1.A.3.b.vi) and road surface wear (NFR Code 1.A.3.b.vii) are included.

Table 130 Emissions from a line (diffuse) source

Pollutant	Dimensions	Quantity for 250 days
CO	kg/km	0.2928
NM VOC	kg/km	0.0280



<b>NO<sub>x</sub></b>	<b>kg/km</b>	6.11
<b>N<sub>2</sub>O</b>	<b>kg/km</b>	0.0983
<b>NH<sub>3</sub></b>	<b>kg/km</b>	0.0303
<b>Pb</b>	<b>g/km</b>	0.0297
<b>PM<sub>10</sub></b>	<b>kg/km</b>	0.3332
<b>Ideno Pyrene</b>	<b>g/km</b>	0.0039
<b>B(k)F</b>	<b>g/km</b>	0.0167
<b>B(b)F</b>	<b>g/km</b>	0.0150
<b>B(a)P</b>	<b>g/km</b>	0.0025
<b>CO<sub>2</sub></b>	<b>kg/km</b>	1 845.54
<b>SO<sub>2</sub></b>	<b>g/km</b>	9.40
<b>C<sub>6</sub>H<sub>6</sub> (benzene)</b>	<b>g/km</b>	0.84
<b>kg/km CO<sub>2</sub>eq.</b>		<b>1,874.63</b>

During the construction period, the amount of greenhouse gases from the site of Chiren UGS to the republic road III-208, expressed in kilograms of CO<sub>2</sub>-eq. is 1.87 tons per km.

Table 131 Annual emissions in tons per year from IU of Chiren UGS

Installations of:	Emissions, t/y		
	SO <sub>2</sub>	NO <sub>x</sub>	CO
Existing site	0.31	35.68	0.88
New site	0.20	85.23	0.58
<b>TOTAL</b>	<b>0.51</b>	<b>120.91</b>	<b>1.45</b>

### 30. Item 4.12.1. of the EIA Report.

#### 4.12.1. Assessment methodology

The assessment of the impacts from the construction and operation on the tangible assets on and near the construction site and subsequently the production site, is in accordance with the current national legislation and the adopted by the project general Impact Assessment Methodology as detailed in item 4.1. Summary criteria for assessing the impact on tangible assets are shown in Table 13 and Table14 below.

Table 32 Assessment criterion degree/size/ magnitude of impact

Impact degree/ size/ magnitude	Criterion
<b>Positive (high positive):</b>	<i>Impacts related to the construction of new facilities and infrastructure sites, which could also be used by the population in the area of the IP and thus have a positive impact on it.</i>

<b>Impact degree/ size/ magnitude</b>	<b>Criterion</b>
<b>Low positive:</b>	<i>Impacts related to the construction of new facilities and infrastructure sites, irrelevant for the population in the area of the IP</i>
<b>Very low positive:</b>	<i>Impacts resulting in long-term improvement of existing tangible assets in the IP area</i>
<b>Insignificantly positive:</b>	<i>Impacts resulting in temporary improvement of existing tangible assets in the IP area</i>
<b>Without change:</b>	<i>No impact on tangible assets on or near the construction/production site is expected</i>
<b>Insignificantly negative:</b>	<i>Impacts resulting in damage to tangible assets in the area, which damage is fully recoverable in a short time and with a minimal investment. The damage to tangible assets that has occurred does not cause any inconvenience to the population in the vicinity.</i>
<b>Negative (low negative):</b>	<i>Impacts resulting in damage to tangible assets in the area, which damage is fully recoverable, and the recovery process is expected to be longer and require significant investments. The damage to tangible assets that has occurred does not cause any inconvenience to the population in the vicinity.</i>
<b>High negative:</b>	<i>Impacts resulting in damage to tangible assets in the area, which damage is fully recoverable, and the recovery process is expected to be longer and require significant investments. The damage to tangible assets results in significant inconvenience to the population in the vicinity, e.g. disruption of power and water supplies, road connections, etc.</i>
<b>Very high negative:</b>	<i>Impacts resulting in irreversible damage to tangible assets, the only remediation of which is related to the construction of new facilities and the damage of which causes inconvenience to the population in the area of the investment proposal - e.g. damage to the power supply, which requires the construction of an entirely new and newly-routed electricity network; damage to access roads, which requires the approval of a new route and the construction of brand new road connections, etc.</i>

Table33 Assessment criteria receptor's sensitivity

<b>Receptor's sensitivity</b>	<b>In terms of tangible assets</b>
<b>Extremely low:</b>	<i>Damaged and currently non-functioning facilities and infrastructure sites</i>
<b>Very low:</b>	<i>Damaged but currently functioning facilities and infrastructure sites</i>

<b>Receptor's sensitivity</b>	<b>In terms of tangible assets</b>
<b>Low:</b>	<i>Facilities and infrastructure sites where damage has occurred but it does not pose a risk to their normal functioning and the damage repair is irrelevant</i>
<b>Average:</b>	<i>Facilities and infrastructure sites that are not currently damaged but are obsolete and their normal functioning requires replacement</i>
<b>High:</b>	<i>Modern facilities and infrastructure sites in good material and technical condition</i>
<b>Very high:</b>	<i>Modern facilities and infrastructure sites in good material and technical condition, relevant to the normal life of the population in the vicinity of the IP, such as water and electricity networks, road connections, etc.</i>
<b>Extremely high:</b>	<i>Newly built facilities and infrastructure sites, relevant to the normal life of the population in the vicinity, such as water and electricity networks, road connections, etc.</i>

### **31. Item 5.5.1 of the EIAR.**

#### 5.5.1. Other existing and/or approved investment proposals

According to information from the national public register with data from EIA procedures on the official website of the Ministry of Environment and Water (<http://registers.moew.government.bg/ovos/?supervisorId=3055&ekDistrictId=6&ekMunicipalityId=49&ekSettlementId=5133>) for the period from 2013 until now, on the territory of Vratsa District, Vratsa Municipality, village of Chiren, a total of 4 procedures for assessing the need for EIA have been carried out.

In the area of Chiren UGS and at the newly formed technological site inextricably linked to the storage, procedures have been carried out in accordance with Chapter Six of the EPA for new investment proposals.

- By Decision No. BP-22-П/2013 of RIEW Vratsa on assessing the need of carrying out an Environmental Impact Assessment (EIA) with an opinion EIA not to be carried out for the IP "Intensive fish farming activities in the existing Chiren dam", which is unlikely to have a significant negative impact on natural habitats, populations and habitats of species subject to conservation in protected areas with ET MARTI-BISER ISAEV as a Contracting Authority. The IP is located approximately 750 m to the north-west of the Chiren UGS site;
- By Decision No. BP-25-П/2014 of RIEW Vratsa on assessing the need of carrying out an Environmental Impact Assessment (EIA) with an opinion EIA not to be carried out for the IP "Conversion of a former poultry farm into a pig farm", which is unlikely to have a significant negative impact on natural habitats, populations and habitats of species subject to conservation in protected areas with Ivailo Atanasov Heselbart as a Contracting Authority. The IP is located approximately 3,100 m to the south-east of the Chiren UGS site;

- By Decision No. BP-3-ΠΡ/2016 of RIEW Vratsa on assessing the need of carrying out an Environmental Impact Assessment (EIA) with an opinion EIA not to be carried out for the IP "Drilling of a new exploitation well E-73 of Chiren UGS, construction of a gathering, individual separation unit and telemetry of the well", which is unlikely to have a significant negative impact on natural habitats, populations and habitats of species subject to conservation in protected areas with Bulgartransgaz EAD as a Contracting Authority. The IP is located approximately 250 m to the north of the Chiren UGS site;
- By Decision No. BP-26-ΠΡ/2018 of RIEW Vratsa on assessing the need of carrying out an Environmental Impact Assessment (EIA) with an opinion EIA not to be carried out for the IP "Raising mulard ducks", which is unlikely to have a significant negative impact on natural habitats, populations and habitats of species subject to conservation in protected areas with Ente 2017 OOD as a Contracting Authority. The IP is located approximately 3,500 m to the south-east of the Chiren UGS site;

### **32. This EIAR are the updated Safety Report and Internal Emergency Plan of the enterprise.**

It is presented in a separate document – Safety report and Emergency plan.

### **33. Item 6.1 of the EIAR.**

#### 6.1. Ambient air and climate

This assessment is based on the following regulatory documents:

- Ordinance No 1 of 27 June 2005 on emission limit values for harmful substances (pollutants) emitted into the atmosphere from sites and activities with stationary emission sources, (promulgated SG No. 64 of 5 August 2005 effective as of 6 August 2005).
- Ordinance on the limitation of emissions of certain pollutants released into the air from medium combustion plants, (promulgated SG No. 63 of 31 July 2018, amended SG No. 47 of 14 June 2019).
- Ordinance No 6 of 26 March 1999 on the procedure and method of measuring the emissions of harmful substances released into the ambient air from sites with stationary sources, (promulgated SG No. 31 of 6 April 1999, amended and supplemented SG No. 61 of 28 July 2017).
- Ordinance No 12 of 2010 on the standards for sulphur dioxide, nitrogen dioxide, fine dust particles, lead, benzene and carbon monoxide in ambient air (promulgated SG, No. 58 of 30 July 2010) effective as of 30 July 2010.
- Ordinance No 7 of 1999 on the assessment and management of atmospheric air quality (promulgated SG No 45 of 14 May 1999) effective as of 1 January 2000.
- Directive 2003/17/EC amending Directive 98/70/EC relating the quality of petrol and diesel fuels,
- Directive 2002/88/EC amending Directive 97/68/EC on the measures against the emission of gaseous and particulate pollutants from internal combustion engines to be installed in non-road mobile machinery;

Guidelines and methodologies used are as follows:

- U.S. Environmental Protection Agency - AP-42 for open-pit dust sources in mines and quarries, Section 11 and 13;
- EMEP/EEA 2016 air pollutant emission inventory guidebook, Chapters:
  - Road transport - NFR code 1.A.3.b.i, 1.A.3.b. ii, 1.A.3.b.iii;
  - Road vehicle tyre and brake wear - NFR code 1.A.3.b.vi;
  - Road surface wear - NFR code 1.A.3.b.vii;
  - Non-road construction mobile machinery with internal combustion diesel engines - NFR code 1.A.2.f ii,
  - Non-road transport- NFR code 1.A.2.f ii (SNAP 0808);
  - Construction - NFR code 2.A.5.b.
- 2006 IPCC Guidelines for National Greenhouse Gas Inventories - Chapter 3 Combustion at ICE (NRF code 1.A.5.b.iii) carbon dioxide upon combustion;
- Methodology for calculating the height of exhaust devices, dispersion and expected concentrations of pollutants in the ground layer of the atmosphere - software product PLUME;
- Methodology for determining the dispersion of emissions of pollutants from vehicles and their concentration in the near-surface atmospheric layer - TRAFFIC ORACLE software product.

Literature:

Bulgaria Climate Guide. Volume I – V;

St. Velev Climate of Bulgaria, 2010;

Meteoblue website, data, for the period since 1985 NEMS global climate model is used to obtain weather parameters at any point on the globe at any time, regardless of whether there is a weather station available for the point. The weather data simulations are performed at an average spatial resolution of 30 km, and the resulting weather data provide good information on typical weather events and expected weather parameters (temperature, precipitation, solar periods, and wind direction and speed).

### **34. Item 6.2.1 of the EIAR.**

#### 6.2.1. Surface waters

The main methods for the assessment of surface waters and the potential impact on them from the implementation of the IP are the ecological analysis and synthesis of available information in literature, legal and regulatory sources as follows:

- Water Act;

- Ordinance No. 6 of 9 November 2000 on emission standards for the permissible content of harmful and hazardous substances in wastewater discharged into water bodies;
- Ordinance No. 2 of 8 June 2011 on the issuance of permits for discharge of wastewater into water bodies and setting individual emission limits for point sources of pollution.

### **35. Item 6.2.2 of the EIAR.**

#### 6.2.2. Groundwater

The main methods for assessment of the groundwater and the potential impact on it from the implementation of the IP are synthesis of available information in literature, legal and regulatory sources and ecological analysis. Legal and regulatory acts used are as follows:

- Water Act
- Environmental Protection Act
- Ordinance No 1 of 2007 on exploration, use and protection of groundwater
- Ordinance No 9 of 19 March 2001 on the quality of water intended for drinking and household purposes;
- Ordinance No 3 of 16 October 2000) on the conditions and the procedure for research, design, approval and operation of sanitary protection zones next to water supply bodies and equipment for drinking and household water supply and close to water supply bodies of mineral water, used for medicinal, preventive, drinking and hygiene needs).
- 2016-2021 Danube Region River Basins Management Plan (RBMP)
- Register of issued permits in the Danube Region Basin Directorate

### **36. Item 6.3 of the EIAR.**

#### 6.3. Soils

- The methods for assessing the impacts on soils are based on expert assessment, analysis of available data and the regulatory framework as follows:
- Soils Act
- Agricultural Land Protection Act
- Agricultural Land Ownership and Use Act
- Ordinance No 3 on the norms for the permissible content of harmful substances in soils
- Ordinance No 26 on reclamation of damaged terrains, improvement of low-productive lands, removal and utilization of the humus layer

Miscellaneous:

- Geography of Bulgaria - Geographical Institute BAS 2002
- Soil Science - G. Gyurov, N. Artinova

### **37. Item 6.4 of the EIAR.**

#### 6.4. Subsoil and mineral diversity

The main methods for assessment of groundwater and the potential impact on it from the implementation of the IP are the ecological analysis and synthesis of available information in literature, legal and regulatory sources as follows:

- Subsurface Resources Act;
- Ordinance No 4 of 21 May 2001 on the scope and content of investment designs
- Ordinance No ПД-02-20-2 of 14 February 2012 on design of buildings and facilities in seismic areas
- БДС EN 1998-1/NA. Eurocode 8: Design of structures for earthquake resistance Part 1: General rules, seismic actions
- Rules for acceptance of earthworks and ground facilities (SG No. 45 of 1988, amended SG No. 7 of 1993);
- Flat Foundation Design Standards
- 2015-2020 National Programme for Prevention and Mitigation of Landslides on the Territory of the Republic of Bulgaria, Erosion and Abrasion along the Danube River Bank and Black Sea Coasts
- Geology map of Bulgaria

### **38. Item 6.5 of the EIAR.**

#### 6.5 Landscape and natural sites

The methods for assessing the impacts on the landscape are based on an expert assessment, analysis of available data and modelling and the regulatory framework as follows:

- Environmental Protection Act
- Agricultural Land Protection Act
- Ordinance No 26 on reclamation of damaged terrains, improvement of low-productive lands, removal and utilization of the humus layer

Miscellaneous:

- Landscape Geography of Bulgaria - Velchev, Penin, Todorov, Konteva, Bulvest 2000
- Landscape Ecology and Landscape Planning - B. Borisova, Academic Publishing House Prof.

Marin Drinov

### **39. Item 6.6 of the EIAR.**

#### 6.6. Biodiversity

In order to assess the impact of the IP on biodiversity, an analysis of the available information has been carried out, including:

- Beshkov, V., Nanev, Kr. 2002. Amphibians and Reptiles in Bulgaria. Pensoft. 120 page.
- Biserkov, V. (Editor), 2007. Identifier of Amphibians and Reptiles in Bulgaria. Sofia, Green Balkans, 196 p.
- Data from the project "Mapping and Determining of the Nature Conservation Status of Natural Habitats and Species - Phase I", <http://natura2000.moew.government.bg>
- Zingstra, H., Kovachev, A., Kitnaes, K., Tsonev, R., Dimova, D., Tsvetkov, P. (edition) 2009. Guidelines for assessing favourable conservation status of NATURA 2000 habitats and species in Bulgaria. Edition Bulgarian Biodiversity Foundation. Sofia.
- Information system for protected areas of the Natura 2000 ecological network <http://natura2000.moew.government.bg/>
- Kostadinova, I., M. Gramatikov (edition) 2007. Ornithologically important sites in Bulgaria and Natura 2000. BSBP, Nature Conservation Series, Book 11. Sofia, BSBP.
- Nankinov D., S.Simeonov, T.Michev, B.Ivanov 1997. Fauna of Bulgaria, vol. 26, Aves, BAS, Sofia
- Peshev Ts., D. Peshev, V. Popov. 2004. Fauna of Bulgaria vol. 27: Mammalia. Edition Marin Drinov, Sofia, 632.
- Register of Protected Territories and Protected Areas in Bulgaria, ExEA, <http://eea.government.bg/zpo/bg/>
- Specific information obtained as a result of a project: "Mapping and Determining of the Nature Conservation Status of Natural Habitats and Species - Phase I, Breeding Birds Report: [http://natura2000.moew.government.bg/PublicDownloads/Auto/PS\\_SPA/BG0002038/BG0002038\\_PS\\_137.pdf](http://natura2000.moew.government.bg/PublicDownloads/Auto/PS_SPA/BG0002038/BG0002038_PS_137.pdf)
- Yankov P. /edition/ Atlas of Breeding Birds in Bulgaria. BSPB. Nature Conservation Series, vol.10
- Abadjiev, S. (2001) An Atlas of the Distribution of the Butterflies in Bulgaria (Lepidoptera: Hesperioidea & Papilionoidea). Pensoft Publishers, Sofia—Moscow, 335 pp.
- Kaseloo PA. 2006. Synthesis of noise effects on wildlife populations. IN: Proceedings of the 2005 International Conference on Ecology and Transportation, Eds. Irwin CL, Garrett P, McDermott KP. Center for Transportation and the Environment, North Carolina State University, Raleigh, NC: pp. 33-35.
- Wilson, Steven F. 2016. Managing zone-of-influence effects of oil and gas activities on terrestrial wildlife and habitats in British Columbia. Journal of Ecosystems and Management 16(1). Published by the Journal of Ecosystems and Management.

#### **40. Item 6.7 of the EIAR.**



## 6.7. Cultural and historical heritage

In the preparation of this analysis, the requirements of the specialized regulations for the protection of cultural heritage were followed. The main regulatory act is:

- Cultural Heritage Act (promulgated, SG No. 19 of 2009);
- Data from "Report on archaeological excavations carried out along the route of the reconstruction of the Vratsa 1 gas pipeline with replacement of sections and construction of a receive chamber at Chiren UGS by displacing an existing chamber at GRS Vratsa, between the villages of Kostelevo and Chiren, north of the town of Vratsa";
- Computer Automated Information System Archaeological map of Bulgaria (AIS AKB).

### **41. Item 6.8 of the EIAR.**

## 6.8. Harmful physical factors

Directives:

- Commission Directive (EU) 2020/367 of 4 March 2020 amending Annex III to Directive 2002/49/EC of the European Parliament and of the Council as regards the establishment of assessment methods for harmful effects of environmental noise;
- Directive 2002/49/EC of the European Parliament and of the Council relating to the assessment and management of environmental noise, EU, 2002;
- Commission Directive (EU) 2015/996 of 19 May 2015 establishing common noise assessment methods according to Directive 2002/49/EC of the European Parliament and of the Council;
- Corrigendum to Commission Directive (EU) 2015/996 of 19 May 2015 establishing common noise assessment methods according to Directive 2002/49/EC of the European Parliament and of the Council;
- Directive 2000/14/EC relating to the noise emission in the environment by equipment for use outdoor
- Laws and regulations:
- Protection from Environmental Noise Act (promulgated SG No. 74 of 13 September 2005 and supplemented SG. No. 101 of 27 November 2020);
- Ordinance No 6 on the environmental noise indicators, taking into account the degree of discomfort during the different parts of the day, the limit values of the environmental noise indicators, the assessment methods of the noise indicator`s values and the harmful effects of noise on public health (promulgated SG No. 58 of 18 July 2006 and supplemented SG. No. 100 of 30November 2021);
- Ordinance No 54 of 2010 of the Ministry of Health and Ministry of Environment and Water on the activities of the national system for environmental noise monitoring and on the

requirements for conducting self-monitoring and provision of information from industrial sources of environmental noise (promulgated SG No. 3 of 11 January 2011);

- Ordinance No 6 on the minimum requirements for health and safety of the employees exposed to noise (promulgated SG No. 70 of 26 August 2005, effective as of 15 February 2006);
- Ordinance on essential requirements and assessment of the compliance of machines and equipment working outdoors with regard to the noise emitted by them in the air (promulgated SG No. 11 of 10 February 2004, effective as of 11 February 2005, last amended and supplemented SG No. 87 of 31 October 2017);
- Ordinance No 9 MPEs for Electromagnetic Radiation in Residential Areas and for Determining Safety Zones Around Electromagnetic Sources (promulgated SG No. 35 of 3 May 1991, last amended SG No. 8 of 22 January 2002);
- Ordinance No 9 on the maximum permissible values of vibrations in residential premises (promulgated SG No. 17 of 2 March 2010);
- Ordinance No 3 on minimum requirements for provision of health and safety of workers against risks connected to vibration exposure (promulgated SG No. 40 of 12 May 2005, effective as of 6 July 2005);

Miscellaneous:

- Methodology for determining the total sound power emitted into the environment by an industrial enterprise and determining the noise level at the point of impact (approved by Order of the MoEW No. ПД-613/08.08.2012);
- БДС ISO 1996-2:2017 Acoustics. Description, measurement and assessment of environmental noise. Part 2: Determination of environmental noise levels.
- БДС 15471:1982 Noise. Methods of measurement and evaluation in the premises of residential, public buildings and settlements.
- БДС EN ISO 5349-1:2002 Vibrations. Measurement and evaluation of human exposure to hand-transmitted vibration. Part 1: General requirements.
- БДС EN ISO 5349-2:2002 Vibrations. Measurement and evaluation of human exposure to hand-transmitted vibration. Part 2: Practical guidance for measurement at the workplace.
- БДС ISO 2631-1:2004 Mechanical vibration and shock. Evaluation of human exposure to whole-body vibration. Part 1: General requirements.
- БДС ISO 1999:2014 Acoustics. Estimation of noise-induced hearing loss.
- БДС 15204-80 Buildings and facilities for industrial enterprises. Method for measuring noise at workplaces.
- БДС ISO 2631-1:2004 Mechanical vibration and shock. Evaluation of human exposure to whole-body vibration. Part 1: General Requirements

**42. Item 6.9 of the EIAR.**

## 6.9. Waste

The following describes the sources of information used for the relevant environmental factor - waste.

- Waste Management Act (Promulgated, SG No. 53 of 13 July 2012, effective as of 13 July 2012, last amended and supplemented SG No. 19 of 5 March 2021);
- Ordinance on Waste Electrical and Electronic Equipment with Council of Ministers Decree No 256 of 13 November 2013 (promulgated SG No.100 of 2003); last amended and supplemented SG No. 2 of 8 January 2021);
- Ordinance No. 2 of 23 July 2014 on waste classification (promulgated, SG No. 36/2013 last amended and supplemented SG. No. 86 of 6 October 2020);
- Ordinance on batteries and accumulators and on waste batteries and accumulators, adopted by Council of Ministers Decree No. 351 of 27 December 2012, promulgated SG No. 2 of 2013); amended and supplemented SG. No. 2 of 8 January 2021);
- Ordinance on waste oils and waste petroleum products, adopted by Council of Ministers Decree No. 352 of 27 December 2012 (promulgated SG No. 2 of 2013); last amended and supplemented SG. No. 2 of 8 January 2021);
- Ordinance No. 1 of 2014 on the procedure and forms for providing information on waste activities and the procedure for keeping public records (promulgated, SG No. 51 of 20 June 2014); last amended and supplemented SG. No. 82 of 1 October 2021);
- Ordinance on Packaging and Packaging Waste adopted by Council of Ministers Decree No 271 of 30 October 2012 (promulgated SG No. 85 of 6 November 2012, effective as of 6 November 2012), last amended and supplemented SG. No. 2 of 8 January 2021);

## 6.10 Health and hygiene aspects

- Health and Safety at Work Act (SG No. 124 of 1997; amended and supplemented SG No. 97 of 5 December 2017);
- Ordinance No. 2 of 22 March 2004 on Minimum Requirements for Health and Safe Working Conditions in the Construction Sector, SG 37/2004;
- Ordinance No. 3 on the minimum requirements for occupational health and safety of workers by use of personal protective equipment at the work place, 19 April 2001;
- 2015-2020 Health Directory NSI;
- Population and Demographic Processes, NSI, 2015-2020.

## Methodologies

- Occupational health and safety management systems - Guide: British Standard, BS 8800, BSI 2004; and Managing Safety the Systems Way: Implementing OHSAS 18001 using BS 8800, BSI 2004;

- Council Directive 89/391/EEC with Guidance on Risk Assessment at work;
- California Environ. Protection Agency – Health Hazards Assessment;
- Presenting Uncertainty in Health Risk Assessment: Initial Studies of Its Effects on Risk Perception and Trust, J. Risk Analysis, Volume 15, Issue 4, p 439–541.

#### **43. Item 6.10 of the EIAR.**

##### 6.10 Health and hygiene aspects

- Health and Safety at Work Act (SG No. 124 of 1997; amended and supplemented SG No. 97 of 5 December 2017);
- Ordinance No. 2 of 22 March 2004 on Minimum Requirements for Health and Safe Working Conditions in the Construction Sector, SG 37/2004;
- Ordinance No. 3 on the minimum requirements for occupational health and safety of workers by use of personal protective equipment at the work place, 19 April 2001;
- 2015-2020 Health Directory NSI;
- Population and Demographic Processes, NSI, 2015-2020.

##### Methodologies

- Occupational health and safety management systems - Guide: British Standard, BS 8800, BSI 2004; and Managing Safety the Systems Way: Implementing OHSAS 18001 using BS 8800, BSI 2004;
- Council Directive 89/391/EEC with Guidance on Risk Assessment at work;
- California Environ. Protection Agency – Health Hazards Assessment;
- Presenting Uncertainty in Health Risk Assessment: Initial Studies of Its Effects on Risk Perception and Trust, J. Risk Analysis, Volume 15, Issue 4, p 439–541.

#### **44. Item 6.11 of the EIAR.**

##### 6.11 Material Activities

- Physical characteristics of the IP for "Design and construction of new above-ground facilities - a compressor station with all its adjacent technical facilities to ensure reliable and continuous operation in gas injection and receiving mode, as well as a new gas measuring station (GIS), in connection with the expansion of the capacity of the underground gas storage facility "Chiren" and their connection with the existing ones".

#### **45. Item 9 of the Environmental Protection Act and an updated Safety Report has been prepared by the enterprise as a separate document - Appendix III to the EIA.**

It is presented as a separate document – Safety report.

#### **46. Appendix 8 of the EIAR**

It is presented as a separate document – Annex 8\_Consultations Table\_EIA.

#### **47. Item 2.2.1.**

2.2.1. In terms of location

The new site must also comply with the following requirements:

Have minimal impact on environment;

Avoid protected areas, Natura 2000 sites and natural sites;

Be remote from settlements, civil and special sites and their adjacent infrastructure, mining and underground exploitation, quarries, explored and concession areas of mineral resources, etc.;

Be distant from areas of archaeological importance;

Not to be in forestry and rocky areas, irrigating, drainage fields, water catchment areas, landslide areas, geologically unstable terrains, areas with pronounced erosion, etc., risk areas;

To be located in a feasible location from an engineering point of view, in accordance with environmental legislation;

Have, as far as practicable, a minimum impact on agriculture;

Implies minimal risk to the security of the compressor station and settlements;

On this basis, the designated new site is located more than 1.2 km from the construction boundaries of Chiren village, in close proximity, to the southwest of the existing one, and all the required new process equipment will be located therein.

In view of the above, no other alternatives have been considered with regard to the location of the new Chiren UGS site.

#### **48. Item 2.2.2**

2.2.2. In terms of technology

The concept of a centrifugal compressor driven by a gas turbine engine (GTE) has been used for implementation of Chiren UGS expansion.

Based on the comparative analysis of the different possible concepts, Option V (ESA) and Option VI (BCA) were rejected in terms of feasibility. Therefore, a comparison of the alternatives in terms of the technical and economic indicators on the number of GTCUs, regarding the capacity of facilities will only be made for the GTCU concept - Option I, Option II, Option III and Option IV.

#### **49. Item 9 of the EPL an updated Report on safety of the enterprise is drawn up as a separate document to the EIA Report which discusses the risk assessment**

It is presented in a separate document – Safety report.