

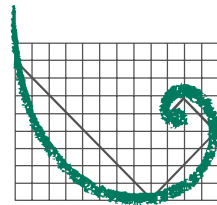
# **Chapter 0: Executive Summary**

## **Mantoverde Development Project EIS**

**Atacama Region, Chile**

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## 0. PROJECT DESCRIPTION

### 0.1. Chapter 1 Project Description

#### 0.1.1 General Information

The works and activities of the Mantoverde development project (MVDP) shall be undertaken in the current areas used by the Mantoverde operation, which are in the Atacama region, province and district of Chañaral, 56 km southeast of the city of Chañaral, 40 kilometres east of the Flamenco Bay and at an elevation of approximately 900 m.a.s.l. The MVDP considers the extraction and beneficiation of new sulphide ore reserves, expanding and deepening sectors that are currently being mined (Celso-Mantoruso and Mantoverde) and beneficiation with a concentrator plant with a maximum processing capacity of 13 Mtonnes/year, with a daily average of 33 ktpd and a maximum of 35.6 ktpd during the life of the project. The gold-bearing copper concentrate production is an average and maximum of 270,000 and 320,000 tonnes/year, respectively, which shall be hauled by truck to the port of Barquito. The mining of sulphides will generate a quantity of oxide ores which will be processed using the existing facilities of the current operation. The project shall be undertaken in one single stage and the kick-off milestone is the construction of the mining facilities.

#### 0.1.2 Description of the Parts, Actions and Physical Works of the Project

The project includes the existing or “without a project” baseline case and the new works/actions or “with a project” case. The baseline case considers all those works, activities or parts that are operative when starting this project. The permits approved or being assessed are then presented, which are the basis of the operation of the MVDP baseline case: 1) environmental impact study of the “Mantoverde Mining Project,” submitted voluntarily in 1993 (hereinafter referred to as the “EIS 1993”); and the “Mantoverde Project Environmental Impact Report” which is part of Ord. N° 3542/1993 of the Home Office, which approved the project with the signature of the regional intendent as the president of the Regional Environmental Commission (COREMA, according to the Spanish acronym) of the Atacama region. 2) Projects after the Environmental Framework Law came into force, which entered the environmental impact assessment system (EIAS) and which currently have their Environmental Qualification Resolutions (RCA, according to the Spanish acronym). 3) Environmental impact statement of the “Mantoverde Oxide Ore Mining” project, RCA N°202/2016.

The “with a project” case has the following works:

Mine-Plant Area: this area is divided into:

- Mine area: mining of the Mantoverde and Celso-Mantoruso zones is envisaged, where material will be extracted to provide continuity to the operation by means of the mining of sulphide and oxide ores.

- Oxide ore plant area: this area considers crushing and classification, agglomeration, heap leaching, leached rubble dump, leaching of low or marginal grade ore, solvent extraction (SX), and electrowinning (EW).
- Sulphide ore processing plant area: this considers primary crushing, coarse ore stockpiling, SAG mill, floatation and regrinding, copper concentrate thickening and filtering, and complementary works of the concentrator plant.
- Power backup system: due to the incorporation of the concentrator plant and its additional works, the installation of five emergency generators with a power of around 1,600 Kw each, along with uninterruptible power supply (UPS) units is considered.
- Supply of recovered freshwater: supplied with desalinated water from the existing desalination plant in the Flamenco Bay sector.

Tailings Dam Area: this area is divided into:

- Main dam and drainage system.
- The tailings conveyance, classification, thickening and distribution system considers: tailings conveyance, cyclone station, sand conveyance and distribution, thickening of complete mud/tailings, conveyance and distribution of thickened mud/complete thickened tailings.
- Water recovery system.
- The water management system considers: a contour channel and contactless water deviation works.
- Monitoring and instrumentation.

Electric Transmission Line (ETL) Area: this area is divided into:

- Electric transmission line
- Main substation

Desalination Plant and Pumping System Area: this area is divided into:

- Desalination plant
- Pumping system
- Electric transmission line

### 0.1.3 Description of the Construction Stage

The execution of the project shall start after obtaining the favourable Environmental Qualification Resolution and the sectorial permits needed for the construction of the works, estimated to be in December 2018. The installation of the work site will start the execution of this phase of the project.

The facilities that will be part of the construction stage are:

- Mine-plant area: prestripping, construction of the sulphide ore processing line, construction of the drinking water treatment plant (PTAP, according to the Spanish acronym) and wastewater treatment plant (PTAS, according to the Spanish acronym), expansion of the sanitary landfill, construction of the civic neighbourhood, construction of the truck maintenance workshop.
- Tailings dam area: construction of the starter dam and drainage system of the tailings dam, construction of tailings conveyance, classification, thickening and distribution systems, construction of the water recovery system, construction of the water management system, construction of the camp, relocation of the piping and electric transmission line.
- Electric transmission line (ETL) area: repowering of the ETL (escarpment, retensing, inversion of crossarms), expansion of the electric substation.
- Desalination plant and pumping system area: installation of the osmosis units, installation of impulse pumps.

**Table 0-1: Main Waste in the Construction Stage**

Waste	Quantity in the Construction Stage
Domestic and assimilable solid waste	563 tonnes/year
Non-hazardous industrial solid waste	563 tonnes/year
Hazardous industrial solid waste	281.25 tonnes/year
Sanitary sludge	28.125 tonnes/year

Source: Own elaboration.

#### 0.1.4 Description of the Operation Stage

The start of the project operation stage considers the first half of 2021 as an estimated date.

The project operation stage will consider extraction of ore and waste from the "Mantoverde zone" and "Celso-Mantoruso zone."

The waste will be deposited at the Mantoruso dump (BOMR, according to the Spanish acronym), Norte dump (BONO, according to the Spanish acronym) and Sur-Este dump (BOSE, according to the Spanish acronym); the high grade ore extracted from the pits will be transported to the oxide and sulphide processing plants, and the low grade oxide ore will be deposited at the low grade ore leach dump (Sur dump) and at the low grade ore leach dump arising from transforming the dynamic heap to a static heap.

The oxide ore processing plant will carry out the unit processes, whose characteristics were mentioned above in the Baseline Case section.

The sulphide ore processing plant will perform the following unit processes: primary crushing, grinding, floatation and regrinding, thickening and filtering of copper concentrate.

The tailings produced by the sulphide ore processing plant will be conveyed and thickened and then finally disposed of at the tailings dam near the mine. The surplus water from the concentrate and tailings thickening processes will return to the plant by means of a water recovery system.

The water needed by the process will be obtained from the current desalination plant located in the Flamenco Bay sector, and power will be supplied by the 110 kV transmission line existing between the Diego de Almagro substation and the mine-plant area.

**Table 0-2: Main Waste in the Operation Stage**

Waste	Quantity in the Operation Stage
Mass mining waste	1,287,000,000 tonnes
Domestic and assimilable waste	471 tonnes/year
Non-hazardous industrial waste	1,398 tonnes/year
Sanitary sludge	23,315 tonnes/year
Hazardous industrial waste	748 tonnes/year

Source: Own elaboration.

### 0.1.5 Description of the Closure Stage

In general terms, the closure plan is drawn up to establish the closure measures and action to safeguard the life, health and safety of people and the environment.

It is important to mention that the formal start of the closure and abandonment stage of the MVDP is envisaged for 2040, when it is estimated the life of the project will end. Nevertheless, after completing the mining of oxides, there could be a transitory cease of all or part of the works or facilities. In such case, the owner will comply with the requirements established in Title III - Temporary Stoppage of Mining Operations of Supreme Decree N°41/2012 of the Mining Ministry.

The closure stage covers the following two periods: a) closure as such in which the activities and works will be carried out when the operation has ended, and b) post-closure, in which there will be follow-up and maintenance activities of the most important closure measures.

**Table 0-3: Main Waste in the Closure Stage**

Type of Waste	Unit	Average Value
Domestic	tonnes/month	6
Non-hazardous industrial	tonnes/month	24
Hazardous industrial	tonnes/month	18
Sludge generated	(m <sup>3</sup> /d)	9.6

Source: Own elaboration.

## 0.2. Chapter 2 Determination and Justification of the Influence Area

The determination and justification of the influence area (IA) considers the general project location information related to the attributes, natural or sociocultural elements of the geographical area to identify the environmental components on which the project generates or has any of the effects, characteristics or circumstances of article N°11 of Law N°19.300.

- **Climate and meteorology:** the IA of this component is the location of the project in the Atacama region, which is an area that was represented by the following weather stations: “Mantoverde Station,” “El Salado Station” and “Santo Domingo Mine Station.”
- **Air quality:** the IA is the scope of the dispersion of the particulate matter modelled, and the town of El Salado is considered for PM10 and PM2.5 and the Guamanga ravine for suspended particulate matter (SPM).
- **Noise:** the IA of this component is the MVDP noise emission scope, and the towns of El Salado, Flamenco and Las Piscinas are considered for human receptors, and the terrestrial fauna receptor is in the Guamanga ravine sector.
- **Lighting:** the IA corresponds to the project location surface areas that will require lighting. This is the mine-plant area.
- **Electromagnetic fields:** the IA corresponds to the adjacent inhabited sectors and the length of the electric line at a distance of 50 m to 100 m from the electric transmission line and a radius of 100 m from the substations. The Mantoverde substation, the town of El Salado and city of Diego de Almagro are considered.
- **Geology and Geomorphology:** the area works envisage a polygon that surrounds them, which is marked off by a variable buffer of least 150 m (according to expert criteria due to the size of the works in this area), and factors regarding summits and ravines. In relation to the lineal works, a 50-m buffer is considered on each side of the central axis of the line.
- **Geological risks:** two different types of topography were identified: zones prevailing with steep slopes and rocky outcrops, and zones prevailing with plains and ravines. In the former zone, the IA is delimited by the distribution of the project works. In areas with prevailing plains and ravines, the IA was delimited following a more geographical criterion, covering larger zones considering water related to extreme precipitation.
- **Soil:** the area works consider a polygon that surround them, which is marked off by a variable buffer of least 150 m (according to expert criteria due to the size of the works in this area), and other factors regarding summits and ravines. In relation to the lineal works, a 50-m buffer is considered on each side of the central axis of the line.
- **Vibrations:** the IA of this component corresponds to the MVDP vibration emission scope, and the towns of El Salado, Flamenco and Las Piscinas are considered.



- **Hydrology:** for the delimitation of the IA of the Guamanga and Las Ánimas ravines, basin criteria defined by the studies conducted by the General Water Board (DGA, according to the Spanish acronym) were used, limiting the extension to the project works and possible effects on the component. Moreover, the basin related to the extension of the ETL is considered, connecting with the Las Ánimas ravine in the south.
- **Hydrogeology and groundwater quality:** the basin of the Guamanga ravine is established for the IA from hydrogeological and water abstraction wells located upstream of the operation to downstream of the projected tailings dam in the western fault, which is part of the Atacama fault system; and the basin of the Las Ánimas ravine, which surrounds the available works and wells present in the basin up to the western fault, which is part of the Atacama fault system.
- **Seawater resources:** the IA corresponds to the coastal sector that spans the zone between Portofino and the Flamenco Bay, which is approximately 5,000-m long and an average of 150-m wide measured from the coastline.
- **Terrestrial ecosystems:** the IA has a total surface area of 6,365.2 ha including all the projected works and their setting. This area comprises the projected work site areas, i.e., mine-plant area, tailings dam area and ETL area.
- **Marine ecosystems:** the IA corresponds to the coastal sector located immediately north of the Flamenco Bay close to the sector known locally as Las Piscinas, in front of which there is the waterbody and seabed that are expected to be affected by the brine discharge and dilution.
- **Cultural heritage:** the area works consider a polygon that surround them, which is marked off by a 100-m buffer, and for the lineal works a 35-m buffer is considered on each side of the central axis of the line.
- **Landscape:** the IA was defined from the determination of four visual basins, which correspond to the area perceived from the points or routes of greater physical and visual accessibility around the project areas.
- **Protected areas and priority conservation sites:** the IA was determined as those areas that have environmental value and which will potentially be fully or partially affected by the works or activities of the MVDP. The specific highlight is the area with environmental value of the Guamanga ravine priority site, which although is not officially listed for the effects of the environmental impact assessment system (EIAS), due to its environmental value it is recognised by means of the regional biodiversity conservation approach.
- **Natural or cultural attractions:** the districts of Chañaral, Diego de Almagro, along with the Atacama region as the administrative base of the territory, were determined as the analysis scales. The area considers the resources, tourist routes and/or circuits near the location of the project works.
- **Use of the territory and its relationship with territorial planning, human environment and projects that have a favourable RCA:** the area is considered in a political-administrative and geographical context, considering the Atacama region as a regional context of the project, and the districts of Chañaral and Diego de Almagro as a district context.

### 0.3. Chapter 3 Environmental Baseline

The environmental baseline describes in detail the current status of the environmental components of the project influence area, according to the information gathered in site campaigns and environmental monitoring records, which was complemented with bibliographical information and data available from other studies of the area.

- **Climate and meteorology:** according to the Köppen classification, the influence area of the MVDP is in the climate subtype called arid or normal desert climate (BWk), representative of the Atacama desert zone and characterised by scarce precipitation and a marked daily thermal oscillation. Despite this, according to the meteorological records obtained, particularly the relative humidity parameter, it can be established that the arid climate with abundant cloudiness (BWn) climate subtype, which is characterised by having coastal air with a high humidity content and annual relative humidity of 74%. This is mainly due to the *camanchaca* (mist) weather phenomenon and is also representative of the project influence area. Regarding the meteorological characterisation, the influence area is characterised by having seasonal behaviour with hot and dry summers and colder winters but with little precipitation.
- **Air quality:** based on the measurements made in 2015-2016 and additionally with the data of measurements undertaken from August 2013-July 2014, in the town of El Salado (closest population to the MVDP) the breathable particulate matter PM10 and PM2.5 does not exceed the annual and daily limits permissible established in the applicable primary standards. Regarding sedimentable particulate matter (SPM), the measurements were made at two stations at the Guamanga ravine, and the results did not exceed the annual limit of the Swiss standard used as a benchmark.
- **Noise:** the levels obtained at each of the measurement points for the inhabited sectors of El Salado, Las Piscinas and Flamenco and of fauna interest of the Guamanga ravine generally do not exceed the maximum permitted levels established in Chilean regulations and the international benchmark standard (United States), respectively, but there is an exception for the night measurement of Flamenco, for which the levels obtained are 6.2% over the limit established.
- **Luminosity:** the luminosity baseline at the mine site of the Mantoverde operation ranges from 0 lux to 137 lux, with 13 of the 21 measurements made in the range of 0 to 25 lux. 62% of the sources studied do not exceed 50 lux, and these emission sources are outdoor lights for the roads inside the mine site and the lighting of the process facilities, information booths and access control.
- **Electromagnetic fields:** the baseline levels of the electromagnetic fields component are below the limits of the German standard used as a benchmark for all the measurement points in the zones of the sensitive receptors and in the emission sources.
- **Geology, geomorphology and geological risks:** the geological structures of the influence area have a close relationship with the path of the Atacama Fault System (AFS) or Atacama Fault Zone (AFZ) with generally a north-south strike. The main structures observed are the Falla Occidental (AFS), Falla Central (AFS), Falla Mantoverde and Falla Oriental (AFS), all of which cross the influence area. Regarding the geomorphology, the project is located in the eastern sector of the morphostructural unit of the Chilean Coastal Range with reliefs of low height (up to 1,000 metres), and its influence area is outlined by the following elements: three old desert drainage systems corresponding to the El Salado, Guamanga and Las Ánimas ravines; the lithological framework, which corresponds to the presence of plutons and volcanic rocks; and the structural framework, marked by the faults of the AFS. The characteristic forms of the relief in the influence area correspond to slopes and foothills, riverbeds and ridges. The geological risks identified are: greater precipitation every 5 to 10 years; slips of blocks of rocks (these are deemed not very dangerous and local events); and the risk of landslides (two sectors are prone).
- **Soil:** the soil in the influence area is mostly of sedimentary origin, with scarce pedological development, of coarse textures, very stratified and with abundant coarse fragments (mainly angular). This soil is due to a desert climate and lies in the “Edaphic Zone” soils of

the desert area, which are characterised by having low development and little water availability.

- **Vibrations:** the levels obtained at each of the measurement points for inhabited sectors (El Salado, Las Piscinas and Flamenco Bay) do not exceed the maximum levels established in the international benchmark standard (United States).
- **Hydrology:** the project is located in a semi-arid coastal zone characterised by exclusively pluvial exorreic basins. In particular, the project area does not have permanent run-offs but only sporadic run-offs related to precipitation events of a high return period. In regard to the run-offs associated with peak precipitation in 24 hours, it is observed that with a return period of 100 years flows of 3.8, 1.1 and 12.2 m<sup>3</sup>/s are generated in the Guamanga and Las Ánimas ravines and Salado river, respectively.
- **Hydrogeology:** the project location site is crossed by the Guamanga and Las Ánimas ravines, both in a southeast and northwest direction: Guamanga in the far south of the site, and Las Ánimas in the north. The Las Ánimas ravine is an affluent of the Salado river, whereas Guamanga is a tributary of the Flamenco ravine. The project is thereby in the surroundings of the division of the lower Salado river and Flamenco ravine sub-basins, DGA codes 0322 and 0331, respectively (DGA, 2000). These ravines have occasional surface flows, related to the scarce precipitation in the area. Average annual precipitation is around 20 mm, whereas annual evaporation is close to 1,380 mm on average. This condition is due to the climates in the zone: predominantly low marginal desert climate with the coastal influence of the desert climate with abundant cloudiness. According to the conceptual model developed for the Guamanga zone, which is the only flow from water upstream of the area modelled and which enters through the deposits of the Guamanga ravine, in the current situation the underground inflow is 3.6 l/s with a precipitation recharge estimated to be 0.9 l/s, which is in keeping with the fact that the precipitation in the zone is virtually non-existent.
- **Groundwater quality:** the influence area of this component envelops the Guamanga and Las Animas basins. Based on the distribution of the project works, the wells were located from the upper sector of the Guamanga ravine to the lower sector (considering the tailings dam sector as intermediate). Those wells that are distributed in the dewatering sector (Las Ánimas ravine) were also indicated. Most of the parameters analysed had no temporary trend. However, some salts, like sulphate, chloride and hence conductivity, had a relative trend to increase in value from upstream to downstream of the influence area (Guamanga ravine). Particularly, the pH values measured during the study timeline remained in a range of 7.0 to 8.0 pH (between alkaline and neutral). Moreover, the concentration of sulphate salt remained relatively stable from the temporary and spatial standpoint (except some specific cases). The aquifers determined in the influence area had a predominantly ionic sodium chloride nature (except upstream of the influence area where the sulphate anion content prevailed in the water, whereas in the dewatering sector chlorine anion content prevailed in the water).
- **Seawater resources:** this was determined as an influence area of the project to study the ocean variables to be considered in the modelling of the dispersion of the saline plume. This is located immediately north of the Flamenco Bay near the sector known locally as Las Piscinas, in front of which there is the waterbody and seabed that is expected to be affected by the brine discharge and dilution. Regarding coastal dynamics, the influence area is characterised by having surface currents that predominantly flow in a northeastern and northern direction. At middle level, they flow to the north and northwest, whereas on the seabed the prevailing flow is to the west and southwest. The physical and chemical parameters of the water quality have a seasonal variability, mainly related to cloudiness, wind speed, pattern of current circulation and biological processes (e.g. photosynthetic activity of the phytoplankton).

- **Flora and vegetation:** for the study area where the Mantoverde development project is biogeographically located, in 2014, 2015 and 2016 there was a record of 473 species of potential flora belonging to 76 families, of which 43% are native and 54% are endemic. Moreover, 54 of them are present in the project area. According to the “Bioclimate and vegetation synopsis of Chile” by Luebert & Pliscoff (2006), the vegetation present in the influence area is the vegetation floor “Coastal Mediterranean desert thicket of *Euphorbia lactiflua* and *Eulychnia saint-pieana*” and “Interior Mediterranean desert thicket of *Skytanthus acutus* and *Atriplex deserticola*,” whereas according to the typology of Gajardo R. (1994) in the “Natural Vegetation of Chile,” the vegetation present in the influence area is classified as “desert of the coastal sierras” and “interior desert of Tal Tal.” Thirteen vegetal formations with 70 species were identified in the study area, accounting for 11.41% of the potential species. These belong to 18 families and 25.71% of the species are native, 10% introduced and 64.28% endemic, with the *Aphyllocladus denticulatus* and *Nolana patula* species endemic to the Atacama region. Five species in conservation status, according to the Wildlife Species Classification Regulation of the Ministry of the Environment, were identified for the influence area, corresponding to *Aphyllocladus denticulatus*, *Eriosyce rodentiophila*, *Gypothamnium pinifolium*, *Oxalis caesia* and *Prosopis chilensis*.
- **Terrestrial fauna:** eight fauna environments were marked off, of which the urban and/or industrial area environment covers the largest surface area, followed by the area devoid of vegetation. Regarding the diversity of species, a total of 39 taxa were recorded, distributed into nine endemic species, 23 native species and 7 introduced species. 10 species in conservation status (Supreme Decree N°05/98 Ministry of Agriculture, Supreme Decree N°33/2011), five species of reptiles: *Callopistes maculatus*, *Liolaemus atacamensis*, *Liolaemus nigromaculatus*, *Liolaemus velosoi* and *Liolaemus platei*, and five species of mammals: *Lycalopex culpaeus*, *Lycalopex griseus*, *Galictis cuja*, *Chinchilla lanígera* and *Lama guanicoe* were classified.
- **Algae, fungi and lichens:** Regarding lichens, six families related to the influence area were characterised: *Acarosporaceae*, *Buelliaaceae*, *Candeaeriaceae*, *Lecanoraceae*, *Lecideaceae* and *Teloschistaceae*. 10 species were found, none of which are listed as being in conservation status in the Species Classification Regulation. Of the total species identified, 30% are of the *Teloschistaceae* family (*Caloplaca cerina* (Ehrh. Ex Hedwig) Th.Fr, *Caloplaca elegantissima* (Nyl.) Zahlbr and *Gyalolechia flavovirescens* (Wulfen) Søchting, Fröden & Arup, whereas the *Buelliaaceae*, *Candeaeriaceae* and *Lecanoraceae* family has the lowest presence of species accounting for 10%. 100% of the species found are native and of these 90% are saxicola, with the exception of *Caloplaca cerina* which is corticicola. In regard to fungi, sampling campaigns were undertaken in different years and weather stations, and the presence of macroscopic fungi was not observed. This might be due to the lack of sufficient humidity to produce the emergence of fructiferous bodies, as the project impact zone is not influenced by the effect of the *camanchaca* (mist) as a contribution of permanent humidity. Likewise, no algae were found.
- **Terrestrial ecosystemic relationships:** vegetation is considered to be the component that best represents the distribution of the different types of ecosystems present in the influence area, which is closely related to water and evident by means of the *camanchaca*, which could be the limiting factor that determines the different types of ecosystems present.
- **Marine biota:** the phytoplankton population had high diversity with a total of 80 species, and this community was dominated by species of diatoms and dinoflagellates. On the other hand, the greater abundance of zooplankton was filtering planktonic crustaceans in the nauplius phase of the Cirripedia class. The ichthyoplankton had a total wealth of six families. However, the abundance levels were virtually all concentrated in Peruvian anchoveta (*Engraulis*

*ringens*), a species of the Clupeiformes order. Regarding vertebrates, two specimens of marine otter (chungungo) were observed near the area of the desalination plant. Coastal birds had a wealth of 14 species, of which only the Neotropic cormorant (*Phalacrocorax brasilianus*) and the Dominican gull (*L. dominicanus*) were more abundant. No common sea lions were found.

- **Marine ecosystemic relationships:** regarding marine ecosystemic relationships, we can conclude that the pH is the abiotic factor that best describes the behaviour or distribution of the macrobenthic communities. Moreover, temperature plays an essential role in shallow areas like the coast, as it can reach quite high levels compared with deeper sectors and the evaporation rate can greatly raise the salinity, with the diversity of the ecosystems of mainly ecotone varying.
- **Cultural heritage:** 11 archaeological sites were detected for the archaeology component in the influence area defined for the project. The findings correspond to archaeological sites that have chronological evidence of historical-subcurrent times, and in particular they reveal human occupations of the 20th century. In regard to the palaeontology variable, the fossil potential in the influence area is of low or zero probability, as most of the rocks present are igneous rocks or andesitic lava which, although having some fossil sedimentary intercalation, they are not present or in the influence area of the MVDP.
- **Landscape:** the project lies in the type of landscape associated with the great north macrozone in the Chilean Coastal Range and Atacama desert subzones in the Atacama region. Seven visual basins related to an observation route comprising the project influence area were delimited for the component; to support the visibility estimate 13 observation points were identified. Based on the respective analysis, it was determined that the landscape value of the visual basins of the project influence area is average, and in these the prevailing feature was recognised to be the characteristics of the landscape of the Chilean Coastal Range in the Atacama region, which are visually attractive but have no outstanding characteristics in their intrinsic components. Likewise, they have a strong presence of anthropic activities related to mining, and this factor impairs the visual quality.
- **Protected areas and priority conservation sites:** the project influence area is not located within any area under official protection in the Atacama region, nor within any of the official priority sites. Nonetheless, part of the works related to the development of the project are within the area with environmental value in the territory called the “Guamanga ravine.”
- **Natural or cultural attractions:** the project influence area, mainly established in the sector of the Mantoverde operation, has no record whatsoever by the National Tourist Board (SERNATUR, according to the Spanish acronym) or other official body of activities related to tourism resources. Nevertheless, the natural or cultural attractions closest to the roads used by the MVDP (particularly the C-13 road) correspond to the Chañaral-Diego de Almagro-Salar de Pedernales (Pedernales salt flat) tourist circuit and to the Cordillera to Sea Heritage Route, the Atacama Route; but it should be clarified that they are not usual destinations of tourist demand.
- **Use of the territory and its relationship with territorial planning:** the use of the current territory in the mine-plant area is characterised by the use of soil for productive activities, specifically of an industrial and mining nature; the tailings dam area has a type of soil with unassigned use, whereas the soil use in the electric transmission line area corresponds to the type of use concerning energy infrastructure. The soil use capacity in the areas related to the project corresponds to type VI, VII and VIII classes, or they have no use capacity classes whatsoever, as the lands have such a degree of alteration that due to their physical and/or chemical characteristics they are very altered and cannot be used for any activity that is not the current one. Regarding the zoning of the soil uses using territorial planning

instruments (TPI) and other important territorial ordinance instruments (TOI) in force in the districts where the physical works and facilities of the project are located, it is considered that the project is not at odds with the zoning guidelines or proposals established in such instruments.

- **Human environment:** this component comprises the town of El Salado and city of Chañaral, along with the coastal towns of Barquito, Flamenco, Portofino, Las Piscinas, Villa Alegre and Torres del Inca in the district of Chañaral. The city of Diego de Almagro and the “Las Parcelas” sector were considered in the district of Diego de Almagro. Although it is true, the districts considered to be part of the influence area have diverse and contrasting socio-demographic, economic and cultural realities, which have an influence on the particular characteristics of each territorial unit. Mining and the harvesting of marine resources are not only important economic and productive activities but also the hub of regional identity.
- **Projects that have a favourable RCA:** 56 of the 185 projects present in the three districts of the influence area had RCAs with some consistency with the criteria presented in the methodology to establish the relationship of those projects with the possible impacts of the MVDP. 95% (53) of the projects reviewed are environmental impact statements, so they correspond to those projects that do not generate what is set forth in article 11 of Law 19.300. Only 5% (3) are projects that were evaluated by means of an environmental impact study.

#### 0.4. Chapter 4 Environmental Impact Prediction and Assessment

Environmental impact prediction and assessment identifies and estimates or quantifies the direct and indirect alterations of the environmental elements outlined in the baseline, arising from the execution of the project in each of its stages. Models, simulations, measurements or mathematical calculations are used for this, and when an impact due to its nature cannot be quantified, its prediction shall have a qualitative nature.

It has been determined that the project will generate a total of 58 impacts, which are identified in one or more stages of the project: 31 in the construction stage, 19 in the operation stage and 8 in the closure stage. The components identified per stage are specifically as follows:

- Construction: protected areas, archaeology, air quality, terrestrial fauna, flora and vegetation, geomorphology, hydrology, lichens, human environment, use of the territory and territorial planning, noise, vibrations and soil;
- Operation: seawater quality, groundwater quality, air quality, electromagnetic field, flora and vegetation, hydrogeology, human environment, use of the territory and territorial planning, landscape, noise, soil, and vibrations;
- Closure: groundwater quality, air quality, flora and vegetation, hydrogeology, human environment, use of the territory and territorial planning.

Seven of the total impacts are qualified as material and affect the flora and fauna component in the construction and hydrogeology phase in the closure stage:

- “Ve-2: loss of specimens of specific flora due to intervention/occupation of new areas” in the mine-plant and tailings dam areas;

- “Fa-1: loss of specimens of reptiles in conservation status due to the intervention/occupation of new areas” in the mine-plant, tailings dam and ETL areas;
- “Fa-2: loss of terrestrial fauna habitat due to the occupation of new areas” in the tailings dam area;
- “Hg-3: upwelling of groundwater” in the tailings dam area.

## 0.5. Chapter 5 Description of the Effects, Characteristics or Circumstances that Give Rise to Drawing Up an EIS

Regarding the description of the effects, characteristics or circumstances that give rise to an environmental impact study (EIS), a relevance analysis is made of the MVDP entering the environmental impact assessment system (EIAS), along with a detailed description of those effects, characteristics and circumstances of article 11 of Law 19.300 (complemented by articles 5, 6, 7, 8, 9 and 10 of Supreme Decree N°40/2013), which give rise to the need of drawing up an EIS.

### 0.5.1 Analysis of the Relevance of the Project Entering the EIAS: Typology

The Mantoverde operation has environmentally approved projects, and the MVDP will modify these in the terms established in letter g) of article 2 of Supreme Decree N°40/2013, when the “g.1,” “g.3” and “g.4” grounds are met.

The primary typology for which the MVDP must be submitted to the EIAS is indicated in letter “i.1,” complemented by “i.3,” as it is a mining development project that envisages action and works whose aim is to extract ore at a rate of 1.4 Mtonnes/month and the construction of a new copper sulphide ore processing line, and it contemplates continuing the extraction and processing of copper oxide ores at an approximate mining rate of 0.6 Mtonnes/month. It also considers expansion of the capacity of the existing waste dumps and low-grade ore leach dump, along with the conversion of the existing dynamic heap to a low-grade ore leach dump and the incorporation of a conventional tailings dam for the sulphide processing line.

The secondary typologies of other works and parts of the MVDP correspond to the following letters: “a.1,” “b.1,” “b.2,” “c”.

### 0.5.2 Effects, Characteristics or Circumstances that Give Rise to the Need of Drawing Up an EIS

The articles of Supreme Decree N°40/2012, indicating the effects, characteristics and circumstances that give rise to an EIS, are shown below.

- **Article N°5 “Risk for people’s health”**: the project does not generate or have risks for people’s health due to the quantity and quality of the effluents, emissions or waste, as outlined in the analysis made of letters a) to d) of this article.
- **Article N°6 “Material adverse effect on renewable natural resources”**: the project needs to enter the EIAS by means of an EIS, since it has the potential to generate material adverse effects on the quantity and quality of the renewable natural resources included in the scenario of this letter b) of the article (loss of terrestrial fauna habitat and loss of specimens of specific flora and fauna).
- **Article N°7 “Resettlement of human communities or material alteration of the lifestyles and customs of human groups”**: the project does not generate a material alteration regarding the resettlement, movement, relocation of human communities, or the

lifestyles and customs of human groups, as analysed in letters a) to d) of this article.

- **Article N°8 “Location and environmental value of the territory”:** the project will not generate a major impact regarding the location in or near to communities, resources and protected areas, priority conservation sites, protected wetlands and glaciers prone to be affected, along with the environmental value of the territory where the project is intended to be located, as analysed in this article.
- **Article N°9 “Landscape or tourist value”:** the project does not generate any material alteration of the landscape or tourist value of the area, as analysed in this article.
- **Article N°10 “Alteration of the cultural heritage”:** the project does not generate any material alteration of the cultural heritage, as analysed in this article.

## 0.6. Chapter 6 Mitigation, Redress and Compensation Measure Plan

The mitigation, redress and compensation measure plan contains a total of 11 measures, of which eight are mitigation and three compensation. The measures were developed for those impacts of the project which, after their qualification and subsequent hierarchisation and assessment, were established as material impacts.

### 0.6.1 Environmental Mitigation Measure Plan

The mitigation measures defined as part of this environmental management plan are shown below. The aim is to prevent or reduce the material adverse effects caused by parts, works and/or actions of the project in whatever their stage of execution, as presented in Chapter 4 of the EIS.

#### Flora and Vegetation

- Ve-2 impact - “Loss of specimens of specific flora due to the intervention/occupation of new areas.”
  - MM-1 - plan to rescue and relocate specimens of *Eriosyce rodentiophila* (Sandillón).
  - MM-2 - conservation of genetic material of specific flora.
  - MM-3 - limitation and control of intervention areas in zones with the presence of specific flora (flora in conservation status and/or of regional endemic origin).
  - MM-4 - training of personnel on the identification and protection of specific flora (flora in conservation status and/or of regional endemic origin) in the zone.

#### Fauna

- Fa-1 impact - “Loss of specimens of reptiles in conservation status due to the intervention/occupation of new areas.”
  - MM-5 - mitigation plan for impacts on species of reptiles.
  - MM-6 - limitation and control of intervention areas of the habitat of specific terrestrial fauna.
  - MM-7 - training of personnel on the protection of fauna in conservation status and of regional endemic origin.
- Fa-2 impact - “Loss of the terrestrial fauna habitat due to the occupation of new areas.”
  - MM-6 - limitation and control of the intervention areas of the habitat of specific terrestrial fauna.
  - MM-7 - training of personnel on the protection of fauna in conservation status and of regional endemic origin.



## Hydrogeology

- Hg-3 impact - “Upwelling of groundwater”
  - MM-8 - pumping at the foot of the dam to capture seepages from the tailings dam.

### 0.6.2 Environmental Compensation Measure Plan

The compensation measures defined as part of this environmental management plan are shown below. The aim is to produce or generate a positive alternative effect and equivalent to an identified adverse effect, which it is not possible to mitigate or redress. The measures are presented according to the environmental component.

#### Flora and Vegetation

- Ve-2 impact - “Loss of specimens of specific flora due to the intervention/occupation of new areas.”
  - MC-1 - Propagation of woody and woody herbaceous species in conservation status.

#### Terrestrial Fauna

- Fa-2 impact - “Loss of terrestrial fauna habitat due to occupation of specimens of specific flora arising from the intervention/occupation of new areas.”
  - MC- 2 - study of the diet of the guanaco (*Lama guanicoe*).
  - MC- 3 - study of the home range of the South American grey fox or chilla (*P. griseus*) and culpeo fox (*Pseudalopex culpaeus*).

### 0.7. Chapter 7 Contingency Prevention Plan and Emergency Plan

The contingency prevention plan and emergency plan contain the actions or measures to be put in place to prevent or minimise the likelihood of risk or contingency situations occurring and the action to be taken if there is an emergency to control them and minimise their effects on the environment and/or people.

In consideration of the works, activities and/or parts of each stage of the project, along with the information of the experience at the Mantoverde operation, analysis of risk prevention experts and the characteristics inherent to the mine site environment, the following risks related to potential contingencies were identified: road accidents, fires, spillage of hazardous substances (due to transport), explosions, spillage of hazardous substances (due to handling), leakage of contact water and/or process solutions, alteration of sites of heritage interest, landslides and rockslides, sediment flows, leakage of tailings, overflow of contour channels, overflow of works to manage process water and/or solutions.

#### 0.7.1 Contingency Prevention Plan

The actions or measures to be put in place to prevent or minimise the likelihood of risk situations occurring are outlined. These measures concern those related to regulatory requirements and those of Mantoverde’s procedures. Most of these measures arise from the commitments made by Mantoverde in the RCAs of projects submitted to the EIAs and from the company’s standards.

### 0.7.2 Emergency Plan

The emergency plan indicates the intervention action, which includes response plans for specific events. The aim of all these plans is for the personnel of Mantoverde, its employees and the communities involved in the project to be ready to respond to the occurrence of an event, presenting the set of procedures and action so that the people threatened by a hazard protect their life and physical integrity, and also the environment. This is to take full advantage of the different elements to minimise the risk factors and the consequences that might arise from an emergency, along with optimise the benefit of own and external resources to respond to such action.

## 0.8. Chapter 8 Environmental Variable Follow-Up Plan

The environmental variable follow-up plan contains follow-up on each of the 12 mitigation and compensation measures presented in Chapter 8 to assure that such variables, which were subject matter of environmental assessment, evolve as projected.

### 0.8.1 Mitigation Measure Follow-Up Plan

#### Flora and Vegetation

MM-1 - "Rescue and relocation plan for specimens of *Eriosyce rodentiophila* (Sandillón)."

The parameters to be used to characterise the status and evolution of the relocated specimens will be as follows:

- Survival.
- Verification of the general development.
- Rooting of specimens.
- Mortality and replanting need.
- Sanitary status of the specimens.
- Status of relocation sites.

MM-2 - "Conservation of genetic material of specific flora."

The methodology used for the follow-up shall be as follows:

- Collection of germplasm, at least in three seed production seasons.
- Storage of germplasm after each collection season.
- Collection report of each season.
- Seed bank delivery records.

MM-3 - "Limitation and control of intervention areas in zones with the presence of specific flora (flora in conservation status and/or of regional endemic origin)."

The methodology used for the follow-up shall be as follows:

- Monthly inspections shall be made until the end of the construction stage, in which if necessary the markers or perimeter fence of the vegetal units with the presence of specific flora that is 100 metres or less from the intervention zone shall be verified and corrected.
- A survey will be conducted of the specific flora present in the vegetal units that are around the works or activities, with a 100-metre buffer area. This survey will be undertaken before the start of the construction stage.
- Surveys will be conducted of the specific flora present in the buffer, with a quarterly frequency in the construction stage.
- A record will be established of the specific flora as a result of the surveys made, which will be compared consecutively.

MM-4 - "Training of personnel on identifying and protecting specific flora (flora in conservation status and/or of regional endemic origin) in the zone."

The methodology used for the follow-up shall be as follows:

- Monthly inspections will be made of the active work sites close to the sectors of the defined buffer.
- A survey will be conducted of the specific flora present in the vegetal units that are around the works or activities, with a 100-metre buffer area. This survey will be undertaken before the start of the construction stage.
- Surveys will be conducted of the specific flora present in the buffer, with a quarterly frequency in the construction stage, and annually in the operation stage (whilst the intervention of new areas lasts).
- A record will be established of the specific flora as a result of the surveys made, which will be compared consecutively.

### **Fauna**

MM-5 - "Mitigation plan for impact on reptile species."

The methodology used for the follow-up shall be as follows:

- Presence and density of the target species after disturbance.
- Presence of burrows or dens (reactivation) in the disturbance zones.
- The parameters to be used during the rescue of the specimens are the number rescued according to their densities estimated by species for the fauna environment affected by the location of project works.
- The parameters to be used to characterise the status and evolution of the relocated specimens shall be as follows:
- Survival and mortality.

MM-6 - "Limitation and control of terrestrial fauna habitat intervention areas."

The methodology used for the follow-up shall be as follows:

The fauna environments with the presence of specific low-mobility fauna shall be monitored in the delimited areas. A photographic record shall be made of the specific low-mobility fauna species with georeferencing of burrows and caves, if applicable, as the result of the monitoring undertaken, which shall be corroborated in the subsequent monitoring.

MM-7 - "Training of personnel on protecting fauna in conservation status and of regional endemic origin."

The methodology used for the follow-up shall be as follows:

- Verification that all workers have the right training and knowledge.
- Inspection within the defined buffer area by means of a visual and photographic record.
- There shall be a record and follow-up of the specific fauna as a result of the records made, which shall be corroborated in the subsequent monitoring.

### **Hydrogeology**

MM-8 - "Pumping at the foot of the dam to capture seepage from the tailings dam."

The methodology used for the follow-up shall be as follows:

- Manual measurement of the levels of wells or installation of sensors.

## **0.8.2 Compensation Measure Follow-Up Plan**

### **Flora and Vegetation**

MC-1 - Propagation of woody and woody herbaceous species in conservation status.

The methodology used for the follow-up shall be as follows:

- Micro-routing report with the identification of the specimens.
- Seed production monitoring reports.
- Seed collection report.
- Monitoring report of nursery plant production.
- Plantation report.
- Monitoring report.

### **Terrestrial Fauna**

MC-2 - Guanaco diet study

The methodology used for the follow-up shall be as follows:

- The field campaigns shall be four days, the laboratory analysis shall be 20 days per campaign.
- The frequency shall be seasonal for four seasons (autumn, winter, summer, spring).

## MC-3 - Study of the home range of chilla and culpeo foxes

The methodology used for the follow-up shall be as follows:

- Capture and record of locations.
- 12-month analysis of data and publication of the study.

### 0.9. Chapter 9 Applicable Environmental Legislation Compliance Plan

The applicable environmental legislation compliance plan provides the general and specific regulatory framework applicable in all the stages of the project. It establishes the relationship, form of compliance and compliance indicator, and it identifies the sectorial environmental permits (PAS, according to the Spanish acronym) and mixed sectorial environmental permits (PASM, according to the Spanish acronym) applicable to the project, establishing their relationship and presenting independently the technical and formal content to vouch for meeting the requirements of issuing them (Appendices of the Chapter).

#### 0.9.1 Applicable Environmental Legislation Identification and Compliance

The general and specific regulation and the form of compliance of the MVDP are outlined below.

##### General Environmental Regulation

- Supreme Decree N°100/2005 establishes the integrated, coordinated and systematised text of the Political Constitution of the Republic of Chile, Chapter III. The Ministry General Secretariat of the Presidency: the project shall comply with all the provisions established in the Political Constitution and shall consider all the legal action to comply with it, exercising the corresponding rights and obligations to such effect. The submittal of the project to the environmental impact assessment system (EIAS) shall assure compliance with the corresponding constitutional guarantees.
- General Environmental Framework Law N°19.300/1994 (modified by Law N°20.417/2010 creating the Ministry, the environmental assessment service and superintendency of the environment). Ministry General Secretariat of the Presidency: the project complies with the obligations laid down in the law by submitting it to the EIAS by means of an EIS, as the project possesses some of the effects, characteristics or circumstances referred to in article 11 of the law, as outlined and concluded in Chapter 5 of this EIS. To such effect, the EIS has the content required by article 12 of this law.
- Decree N°40/2012 approving the environmental impact assessment system regulation. Ministry of the Environment: the project complies with the obligations set forth in this regulation by submitting it to the EIAS with an EIS. To such effect, and as required by this regulation, the content of the environmental impact studies laid down in article 18 of the regulation will be complied with.
- Supreme Decree N°72/1985 on the Mining Safety Regulation, whose integrated, coordinated and systematised text was established by Supreme Decree N°132/2002. Mining Ministry: throughout the project execution cycle the owner shall comply with all the provisions regarding the environmental components established in the Mining Safety Regulation. Regulation compliance includes the following:

Before starting the execution of the works of the update project, the owner shall send the National Geology and Mining Survey (SERNAGEOMIN, according to the Spanish acronym) a letter of notification and the Environmental Qualification Resolution (RCA, according to the Spanish acronym) of approval issued by the environmental assessment service (SEA, according to the Spanish acronym), as laid down in article 67 of this regulation. If the project does not have a favourable Environmental Qualification Resolution, SERNAGEOMIN may not give authorisation approving the execution of the works.

This chapter shows the mixed sectorial environmental permit (article 137) of the mine site closure plan, which after securing the RCA shall be processed sectorially and comply with what is set forth in Title Five of this Regulation.

After securing the RCA, the owner shall submit a report to SERNAGEOMIN on how the project is to be undertaken, complying with article 22 of the Regulation.

- Law N°20.551/2011 regulates the closure of mine sites and facilities. Mining Ministry, and Supreme Decree N°41/2012 on the Mine Site and Facility Closure Law Regulation. Mining Ministry: the works, measures and activities to be included in the closure plan will be presented. These measures shall be determined based on a risk assessment that the company shall undertake at its mine site and for the facilities it comprises to assure physical and chemical stability after operations have ceased.

### Specific Environmental Regulation

- Air quality and atmospheric emissions: the project shall comply with all the related provisions to prevent atmospheric emanations or contaminants of any kind during the different stages of the project, thereby faithfully complying with the emission levels of current regulations. This is to comply with the following regulations: Supreme Decree 144/1961; Supreme Decree 279/1983; Supreme Decree 75/1987; Supreme Decree 211/1991; Supreme Decree 54/1994; Supreme Decree 55/1994; Supreme Decree 4/1994; Supreme Decree 20/2013; Supreme Decree 12/2011; Supreme Decree 138/2005 and Supreme Decree 61/2008.
- Noise: the project shall strive to comply with all the related provisions to prevent a deterioration of community and worker health by maintaining the maximum noise emission limits generated by emission sources of the Mantoverde operation. This is to comply with the following regulations: Supreme Decree 38/2012 and Supreme Decree 594/1999.
- Drinking water: all the corresponding authorisations shall be applied for and the restricted parameters and the conditions laid down in the current regulation on drinking water shall be complied with. This is to comply with the following regulations: Statutory Decree 725/1967; Supreme Decree 735/1969; Supreme Decree N°72/1985, article 65 (modified by Supreme Decree 132/2002); Decree 446/2006; Supreme Decree 594/1999; Supreme Decree 50/2003.
- Wastewater: the wastewater and sludge from the new wastewater treatment plant (PTAS, according to the Spanish acronym) of the camp in the tailings dam area and current PTAS of the mine-plant area, bathrooms and private sewage network shall be treated so they meet the requirements of the current regulation and have the pertinent sanitary authorisation. They shall thereby comply with the following regulations: Statutory Decree N°725/1967, article 71, letter b) and article 73 (modified by Law N°20.533); Supreme

- Decree N°236/1926 (modified by Supreme Decree N°53/2004); Statutory Decree N°1/1989, N°22; Supreme Decree N°72/1985, article 64 (modified by Supreme Decree 132/2002); Supreme Decree N°594/1999, Title II-paragraph IV (modified by Decree N°123/2015); Supreme Decree N°4/2009; and Supreme Decree N°655/1941, article 15.
- Seawater: regarding the discharge of discard brine, this shall comply with the maximum concentration limits for discharges of liquid waste into bodies of seawater outside the coastline protection zone. This is to comply with the following current regulations: Supreme Decree N°1/1991; Decree N°90/2000; Supreme Decree N°296/1996; and Supreme Decree N°295/1986.
  - Waste: the waste generated in the different stages of the project, the expansion of the capacity of the sanitary landfill and construction of the waste transfer yard shall comply with all the sanitary conditions laid down in the current regulation, along with the respective sanitary authorisation. This is to comply with the following current regulations: Statutory Decree N°725/1967, articles 79 and 80 (modified by Law 20.724); Statutory Decree N°1/1989 N°22; Supreme Decree N°594/1999, Title II-paragraph III (modified by Supreme Decree N°4/2010); Supreme Decree N°189/2005; and Supreme Decree N°148/2003.
  - Mass mining waste: the project envisages the expansion of three waste dumps (BONO, BOSE, BOMR), an increase in the capacity of the low-grade ore leach dump (Sur leach dump), and the transformation of the current high-grade ore leach pad into a low-grade ore leach dump (area 1-2). The owner shall correctly apply the rules and instructions or regulations of the Service, meeting all the requirements, thereby presenting PASM N°136. It shall also construct a tailings dam with a design allowing for the physical and chemical stability of the dam and its environment, complying with the specifications of Supreme Decree N°248/2003, and meeting all the environmental requirements submitted in PASM N°135.
  - Transport and storage of hazardous substances: the transport, storage and handling of hazardous substances shall be undertaken complying with the current regulation, and having all the sectorial permits needed to carry out such activity; also by means of mechanisms of contracts with duly authorised companies. All this is to comply with the following current regulations: Supreme Decree N°298/1994 (modified by Supreme Decree N°116/2001); Supreme Decree N°160/2008, Title IV; Supreme Decree N°72/1985, article 20 (modified by Supreme Decree N°132/02); Law N°17.798/1972; and Supreme Decree N°73/1992 and Supreme Decree N°83/2008; Decree N°167/2009; Supreme Decree N°29/2005, NCh 382 Of.2004; Supreme Decree N°29/2005, NCh 2120 Of.2004; Supreme Decree N°254/2003, NCh 2245 Of.2003; and Supreme Decree N°78/2010.
  - Radioactive substances: the project shall comply with all the provisions contained in the current regulation, and the company shall keep all the permits in force for the transport, use, storage and waste of the equipment to be used. At the same time, the equipment shall be handled by authorised specialists and the transport of these sources shall be undertaken by authorised carriers. What is mentioned is to comply with the following current regulations: Law N°18.302; Supreme Decree N°12/1985; Supreme Decree N°133/1984; Supreme Decree N°3/1985.
  - Soil: the project is an integral part of the general and specific technical procedures to prevent potential contamination. These include the procedure for handling hazardous supplies, hazardous waste management plan and the respective prevention and contingency plans, among others. Moreover, all the facilities of the project are built on impermeable foundations with contour channels that prevent the seepage of any substance that might accidentally be spilt into the natural soil. It should be highlighted that the project does not consider discharges of industrial liquid waste into surface or ground waterbodies. This will comply with the current regulation, Decree Law N°3.557/1982 - article 11.

- Natural resources: the owner of the project envisages undertaking activities for the mitigation of impacts on species of fauna in conservation status. Such activities include the capture, rescue and relocation of low-mobility species of wild fauna classified in conservation status, considering the implementation of mixed sectorial environmental permit 146. All this is to comply with the following current regulations: Law N°19.473/1996 replacing the text of Law N°4.601; Supreme Decree N°5/1998 (modified by Supreme Decree N°53/03); Law N°20.283/2008, article 60; Supreme Decree N°93/2009 (modified by Supreme Decree N°26/2012); Supreme Decree N°68/2009.
- Transport and road administration: the owner shall require its personnel and hire carriers to comply with this current regulation and, if applicable, the respective authorisation of the Road Administration and thereby comply with the following regulations: Statutory Decree N°1/2009 (modified by Law 20.410); Supreme Decree N°75/1987 (modified by Supreme Decree N°78/97); Supreme Decree N°158/1980 (modified by Decree N°1910/2002); Resolution N°1/1995 (modified by Resolution N°6/2001); Supreme Decree N°19/1984 (modified by Decree N°1665/02) repealing Decree N°1.117/1981; Statutory Decree N°850/1998 (modified by Statutory Decree N°2/2006), article 30; Supreme Decree N°80/2004.
- Land management: the project is located in a rural area, so the company shall apply for PAS 160 and the corresponding sectorial permits (article 160 of Supreme Decree N°40/2012) for the physical works of the project, if applicable. This is to comply with the following regulations: Statutory Decree N°458/1976 (modified by Law N°20.443), subparagraph 4 of article 55; Supreme Decree N°47/1992 (modified by Supreme Decree N°9/2011).
- Cultural heritage: the company shall comply with the regulation, instructing all personnel to stop works and notify the supervisors of the work site, if ruins, deposits, pieces or objects of a historical, anthropological, archaeological or palaeontological nature are found during excavation to undertake the works. The owner shall inform the respective provincial governor of the finding, pursuant to what is laid down in article 26 of the Law on National Monuments and article 23 of the Regulation of Law N°17.288. This is to comply with current regulations: Law N°17.288/1970 (modified by Law N°20.021/2005); Supreme Decree N°484/1990.
- Electricity: the owner shall comply with what is laid down in the current regulation regarding any electrical installation made at the operation and in zones of public use. Likewise, it shall make sure that there is compliance with all the safety conditions established. This is to comply with the following regulations in force: Statutory Decree N°4/1982; Supreme Decree N°327/1998; Supreme Decree N°4.188/1955 (NSEG 5. E.n71. standard); Supreme Decree N°115/2004 (modified by Supreme Decree N°214/2004).
- Light pollution: before installing the lights required by the project they shall have certification prior to installation referred to in Title III, article 13 of Supreme Decree 43/2012 of the Ministry of the Environment, thereby guaranteeing meeting the requirements of the standard.
- Extraction of aggregates: all the permits for extracting aggregates on private property shall be requested from the Department of Municipal Works, thereby complying with Exempt Decree 20.
- Phytosanitary protection: the project considers the transport of material for construction and maintenance equipment for the work site, which shall be transported in wooden packing, thereby complying with Resolution N°133.



## 0.9.2 Sectorial Environmental Permits

The sectorial environmental permits (PAS) and mixed sectorial environmental permits (PASM) applicable to the project are outlined below:

- PAS 115 - Permit to introduce or discharge harmful or hazardous matter, energy or substances of any kind to water under national jurisdiction: the project needs to increase desalinated seawater production from 120 l/s (current requirement of the Mantoverde operation) to 380 l/s (requirement of the MVDP), and it is therefore necessary to modify the seawater treatment capacity, which will finally lead to modifying the characteristics of the effluent of the current desalination plant that is discharged into the sea.
- PASM 135 - Permit for the construction and operation of the tailings deposits: the project envisages the construction and operation of a tailings dam for the new copper sulphide ore processing line.
- PASM 136 - Permit to establish a waste dump or material stockpiling: the project requires the granting of the mentioned sectorial permit, as the company plans to expand the three waste dumps existing at the Mantoverde operation (BONO dump, BOSE dump, BOMR dump), increase the capacity of the low-grade ore leach dump (Sur leach dump) and transform the current high-grade ore leach pad into a low-grade ore leach dump.
- PASM 137 - Permit for approval of the mine site closure plan: the project modifies part of the existing works and facilities and implements new works and facilities for the extraction and beneficiation of sulphide reserves, for which it will be necessary to update the current closure plan.
- PASM 138 - Permit for the construction, repair, modification and expansion of any public or private work for the emptying, treatment or final disposal of drains and wastewater of any kind: the project envisages the construction of a wastewater treatment plant for the “tailings dam area camp” facility.
- PASM 139 - Permit for the construction, repair, modification and expansion of any public or private work for the emptying, treatment or final disposal of industrial or mining waste: the project considers increasing the desalinated seawater production from 120 l/s (current requirement of the Mantoverde operation) to 380 l/s (requirement of the MVDP) and it is therefore necessary to modify the seawater treatment capacity, which will finally lead to modifying the characteristics of the effluent of the current desalination plant that is discharged into the sea.
- PASM 140 - Permit for the construction, repair, modification and expansion of any treatment plant of rubbish and waste of any kind or anywhere for the accumulation, selection, industrialisation, commerce or final disposal of rubbish and waste of any kind: the project requires the construction of a new waste transfer yard for the temporary storage of industrial waste.
- PASM 141 - Permit for the construction, repair, modification and expansion of a sanitary landfill: the project envisages expanding the current sanitary landfill by 3.1 hectares.
- PASM 142 - Permit for any site for the storage of hazardous waste: the project will implement a new waste transfer yard for the temporary storage of hazardous industrial waste.
- PASM 146 - Permit for the hunting or capture of specimens of animals of protected species for research purposes, for the establishment of reproduction centres or breeding places and for the sustainable use of the resource: the MVDP envisages the rescue and relocation of nine species of specific low-mobility fauna that will be affected by the works and/or activities of the project in the mine-plant, tailings dam and electric transmission line areas.

- PASM 155 - Permit for the construction of certain hydraulic works: this permit is applicable to the construction of the tailings dam and its contour channel (design flow of 4.7 m<sup>3</sup>/s).
- PASM 156 - Permit to make modifications to the riverbed: the project requires the granting of the mentioned sectorial permit, due to the following works crossing the Guamanga ravine: crossing N°1 - tailings conveyance and recovered water system, crossing N°2 - desalinated seawater conveyance system.
- PASM 160 - Permit to subdivide and install urban utility services on rural lands or for construction outside urban limits: this permit is required, since new facilities will be built, such as: tailings dam area camp, electrical rooms and civic neighbourhood.

## 0.10. Chapter 11 Voluntary Environmental Commitments

The voluntary commitments are those environmental commitments that are not required by current legislation, which the project owner intends to assume to be responsible for insignificant impacts, which in the opinion of an expert are important to control. Four commitments are specifically established that are indicated below:

### Hydrogeology and Water Quality

- Ca-1 impacts – Alteration of Groundwater Quality and Hg-2 – Modification of Groundwater Levels.
  - CoVo-1 – Monitoring that will increase the quantity and quality of hydrogeological baseline data in the pre-operation period of the tailings dam for possible adjustment of the numeric model.
  - If necessary, update or re-definition of the parameter values that are threshold values for starting the operation of impoundment wells.

### Water Quality

- Ca-1 impacts - Alteration of Groundwater Quality and Hg-2 – Modification of Groundwater Levels.
  - CoVo-2 – Monitoring of groundwater quality in the tailings dam area.

### Oceanography

- OC-1 impact – Alteration of the physical and chemical quality of seawater.
  - CoVo-3 – Environmental Surveillance Plan for the Marine Environment.

### Archaeology

- Ar-1 impact – Intervention of Archaeological Sites in the MVDP Influence Area.
  - CoVo-4 – Protection of Archaeological Sites that will remain in the MVDP.