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# ENVIRONMENTAL IMPACT ASSESSMENT (SCOPING) REPORT



**FOR THE PROPOSED EXPLORATION AND SMALL  
SCALE MINING ACTIVITIES MINING CLAIMS NO. 70459  
AND 70460 LOCATED AT UIS DISTRICT ERONGO  
REGION**

**May 2023**

<b>DOCUMENT INFORMATION</b>	
<b>Title</b>	Environmental Impact (Scoping) Report for the base and rare metals and other industrial minerals found at Mining Claims No. 70459 and 70460 located in district, Erongo region.
<b>Report reference number</b>	KME001/2023
<b>Activity</b>	Activity 3: Mining and Quarrying Activity 8: Water Resource Developments
<b>Location</b>	Mining Claims No. 70459 and 70460 located on state land 20km west side of Uis, along the C35 road in Erongo Region
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## **EXECUTIVE SUMMARY**

Karlowa Mining Enterprise (Pty) LTD appointed Gwayela Environmental Solutions to conduct an environmental assessment for the exploration activities of base and rare metals and other industrial minerals at Mining Claims No. 70459 and 70460 located in district, Erongo region.

This report aims to inform Karlowa Mining Enterprise of any probable, negative and positive impacts arising from the project, prior the implementation of the project. The EMP attached to this report further indicates mitigation measures to be implemented in order to mitigate the envisaged negative impacts identified during the assessment process.

The proposed project will be established in a historic mining area, where there are currently existing, several explorations and mining operations taking place near the proposed site. The conducted assessment indicates that the proposed exploration activities the mining claims No. 70459 and 70460 will have some negative impacts on the environment if unmanaged. Employees' exposure to hazards arising from mining will cause occupational related conditions immediately or at the later stage, as well as potential pollution of the local aquifers.

Therefore, for the proponent to establish the proposed project, the assessment team recommend that they acquire an Environment Clearance Certificate as required by the Law. The proponent should hence submit this report as part of the ECC application process to the ministry of Environment and Tourism.

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## DEFINITIONS

Acronym	Definition
dBA	Decibels
EC	Environmental Commissioner
ECO	Environmental Compliance Officer/s
DEA	Department of Environmental Affairs
ECC	Environmental Clearance Certificate
EIA	Environmental Impact Assessment
EMA	Environmental Management Act (Act No. 7 of 2007)
EPL	Exclusive Prospective Licence
EMP	Environmental Management Plan
I&Aps	Interested and Affected Parties
KM	Kilometres
MC	Mining Claim
MEFT	Ministry of Environment Forestry and Tourism
No.	Number

## GLOSSARY

PHRASE / NAME / WORD	DEFINITION
Karlowa (aka KME)	Karlowa Mining Enterprise (Pty) LTD –the proposed project initiator and proponent.
Gwayela	Gwayela Environmental Solutions cc –the appointed environmental assessment practitioner for the project.
Proponent	A natural person or a company proposing to initiate any commercial project in Namibia.
Wastewater	All categories of wastewater (process water, effluent etc) generated from various processes which need to be contained safely.
Drainage system	Comprises of channels, trenches and pipes that carries wastewater.
Hazard	Any risk that can cause physical, chemical, psychological ergonomical and biological harm to the employees or immediate environment.
Mining Claim	A 1-year license that give the owner to have exclusive rights to systematically explore in allows in an areas of up to 1,000 km.
Mining related	An activity which may not be undertaken without an Environmental Clearance Certificate (ECC) according to the provision of Environmental Management Act No.7 of 2007.

# CHAPTER 1

## 1. INTRODUCTION

### 1.1 Karlowa Mining (Pty) Ltd

Karlowa Mining Enterprise (PTY) Limited) is 100% Namibian owned company that mainly focuses on exploration and mining activities. The company specializes in other areas such as commodity trading, investments, import and export and export of mineral resources.

The company is driven by young dynamic Namibians who exert their efforts into improve the lives of the Namibian people. Their primary objective is to ensure that value is added to local resources and economic benefits is realized by the people on the grassroots. Thus the exploration activities aims to contribute to the discovery of minerals such as copper, tin, tantalum, and lithium which can be sold on the global market and bring value to the Namibian economy.

The proposed exploration activities at MC No. 70459 and 70460 trigger activities that are listed under the EMA. Meaning an EIA should be conducted to comply with the national legal framework as well as prevent any eventuality that will jeopardize the company's continental reputation. Karlowa Mining envisioned this undertaking to show its commitment towards national compliance and contribution to growth at home in Namibia.



## 1.2 Location

The proposed exploration activities will take place on a two claims namely MC 70459 and 70460, located within the Karlowa area in Erongo region. The site is located 20 km south-west side of Uis, along the C35 road between Uis and Hentis Bay referred to in Figures 2-1. The site covers 31.1309 hectares and is coordinated at the points as summarized in *Table 2-1 and 2 below*.

Table 2-1: MC No. 70459 Coordinates

Corner	Latitude	Longitude
1	21 <sup>0</sup> 27' 05.85" S.	14 <sup>0</sup> 41' 06.55" E.
2	21 <sup>0</sup> 27' 06.48" S.	14 <sup>0</sup> 41' 16.28" E.
3	21 <sup>0</sup> 27' 21.33" S.	14 <sup>0</sup> 41' 09.70" E.
4	21 <sup>0</sup> 27' 20.08" S.	14 <sup>0</sup> 40' 59.87" E .

Table 2-2: MC No. 70460 Coordinates

Corner	Latitude	Longitude
1	21 <sup>0</sup> 26' 05.85" S.	14 <sup>0</sup> 41' 06.55" E.
2	21 <sup>0</sup> 26' 06.48" S.	14 <sup>0</sup> 41' 16.28" E.
3	21 <sup>0</sup> 26' 21.33" S.	14 <sup>0</sup> 41' 09.70" E.
4	21 <sup>0</sup> 26' 20.08" S.	14 <sup>0</sup> 40' 59.87" E .



Figure 1: Location of the proposed mining operations (Google source)



Figure 2: Specific Mining Claims

### **1.2.1 Project Rationale and Motivation**

Namibia is one of the well-known players in the global mining scenery, due to the fact that, the country is also blessed with substantial minerals' deposits that are critical to the global economy. For instance, Namibia is the 4<sup>th</sup> largest global producer of uranium and critical player in the diamond industry. Many of these minerals are exported in the raw form or semi processed. Mining is the one of the top four contributors to the Namibian national economy, contributing up to 25%.

The current demand for electrical vehicle on the global market has gone spiral so is the demand for lithium due to the fact that lithium is used in the manufacturing of electrical car batteries. All countries with lithium ores and minerals are preparing and setting themselves for this current global demand, Namibia included. The country is blessed with the lithium belt located in Erongo region and the Namibian government is strongly advocating for the mining of this mineral and other minerals mining for the benefit of its people. Thus, through the ministry of trade & Industrialization, the government lobbies for mineralization value-added processing, which involves the transformation of a primary material (produced by mining and extraction processes), to a more finished product, which has a higher value. This encourages licensed mining holders to not only invest in local manufacturing, but to also contribute to economic development. The government believes, through these partnerships mining can contribute to minimizing unemployment and alleviating people from poverty.

Due to the scale of the project, the operation will only employ 15 people of who the project will source them locally where possible.

### **1.3 Terms of Reference for Environmental Assessment**

Karlowa Mining Enterprises (Pty) Ltd appointed Gwayela Environmental Solutions to undertake the Environmental Impact Assessment (EIA), scoping exercise and to develop an Environmental Management Plan (EMP), for the proposed exploration activities at MC No. 70459 and 70460 in Uis, Erongo Region.

The assessment includes:

- Description of the receiving environment that may be affected by the proposed project and the way the physical, biological, social, economic and cultural aspects of the environment may be affected;

- Description and assessment of the significance of any significant effects, including cumulative effects, that may occur as a result of the undertaking of the activity or identified alternatives or as a result of any construction, erection or decommissioning associated with the undertaking of the proposed development;
- Information on the proposed management, mitigation, protection or remedial measures to be undertaken to address the effects on the environment that have been identified including objectives in respect of the rehabilitation of the environment and closure; and
- Description of the manner in which KME intends to modify, remedy, control or stop any action, activity or process which could cause pollution, labour related disputes or environmental degradation.

### **1.3.1 Application for ECC**

This report will be submitted by the consultant on behalf Karlowa Mining Enterprises for the purpose of applying for the ECC. Changes in project activities and plan will require the proponent to update the prepared EMP.

## CHAPTER 2

### 2. PROJECT INFORMATION (TECHNICAL)

#### 2.1. The Mining Process

Karlowa mining intends to set up a small scale mining operations in exploration for lithium, tantalum, tin and copper minerals found at MC 70459 and 70460. The key activities are comprised of:

- Reef exposure and preparation
- drilling and blasting
- face clean-up ( mobile conveyors)
- material feed to the Mobile plant
- Material Commutation ( crushing, jaw, and roll)
- Screening and sizing of material
- magnetic separation
- Air separation and sizing
- Dirty concentrate to the flotation plant

Due to that the scale, of the mining activities taking place no permanent structures will be erected on site.

## 2.2. Socio-economic Development

The town of Uis, popularly referred to as “Damaraland” locally, is historically a well-known tin mine settlement, located in the Daureb constituency of Erongo region. The town plays a significant role in mining of mineral deposits globally. Uis is predominantly known for its tin mining and tourism related activities and is popular for its Brandberg Mountain, the highest altitude points in Namibian. The Brandberg mountain is home to the world’s famous “*White Lady*” rock painting, which is said to be over 20,000 years old. There are two communal conservancies in the constituency of Daureb, namely; Tsiseb and Daureb. The proposed mining site is located within the Tsiseb conservancy. Through these conservancies, the government of Namibia has devolved usage rights for the utilisation of the natural resources to community members, and community members subsequently are responsible for the management and conservation roles of such natural resources. This concept has hugely improved the socio-economic conditions for the communities in Namibia.

The town of Uis has a total population of 3,600 inhabitants. Uis flourished as a mining economic hub of the constituency, particularly in 1958 when mining productions were at peak. However, this changed when the global market forces together with the geopolitical sphere of that time rendered the mining operations uneconomical and the mine to wind up in the early 1990s, leading to it being downgraded from a village council to a settlement in terms of the national local authority classification in 2010, crashing its socio-economic status despite its rich mineral resources. Compared to other Namibian towns, Uis is still relatively underdeveloped, which consequently contributed to severe poverty and alcohol abuse experienced by members of the communities. Table 4 provides the town’s demographic profile and socio economic outlook relevant for any development.

In recent times, the town’s mining profile is steadily reigniting, and the entrance of mining development outfits into Uis, such as at Karlowa Mining Enterprises will contribute to its economic development. The proponent is committed to consider the town’s labour outlook in order to provide a real impact in creating local employment.

## CHAPTER 3

### 3. LEGAL FRAMEWORK

#### 3.1. The Namibian Constitution

The Namibian constitution is the supreme law of the country and makes provision for environmental protection and sustainable development. Article 95(1) of the Constitution of Namibia states that “*The state shall actively promote and maintain the welfare of the people by adopting policies aimed at the maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future*”.

To fulfill the Article 95 of the Constitution, the Government for the Republic of Namibia enacted the Environmental Management Act (Act No. 7 of 2007) in 2007 and subsequently, the adoption of EIA Regulations in 2012 (Government notice no: 30 of 2012).

#### 3.2. Environmental Management Act No. 7 of 2007

The environmental management act No.7 of 2007 is the custodian legal framework and guidance for all environmental impact assessments in Namibia. The aim of the Act is to promote the sustainable use of natural resources and provides the framework for the environmental and social impact assessment, demands precaution and mitigation of activities that may have negative impacts on the environment and provision for incidental matters. Furthermore, the Act provides a list of activities that may not be undertaken without an environmental clearance certificate.

The purpose of the Environmental Management Act is:

- a) to ensure that people carefully consider the impact of developmental activities on the environment and in good time
- b) to ensure that all interested or affected people have a chance to participate in environmental assessments



- c) to ensure that the findings of environmental assessments are considered before any decisions are made about activities which might affect the environment.

### 3.2.1. Listed Activities

The Environmental Management Act (EMA), Act No. 7 of 2007, stipulates that, for each activity listed under the EIA regulations, an Environmental Impact Assessment (EIA) is required.

Listed activities may not be undertaken without an Environmental Clearance Certificate (ECC). Section 7 of the Environmental Impact Assessment (EIA) Regulations (GN notice No. 30 of 2012), stipulates that if an activity is listed, an EIA scoping exercise should be undertaken and a Scoping Report and Environmental Management Plan should be submitted to the Environmental Commissioner (EC) as part of the application for an Environmental Clearance Certificate (ECC).

The establishment of small scale mining operation at Karlowa's mining claims is one of the listed activities to not be conducted without an ECC, as per the rationale presented in *Table 2* below.

Table 2: List of activities relevant to the proposed project

Activity	Specific Activity	Proposed Activity
Activity 3 Mining & Quarrying Activities	3.1 The construction of facilities for any process or activities which requires a license, right or other form of authorization, and the renewal of a license, right or other form of authorization, in terms of the Minerals (Prospecting and Mining Act), 1992.	Karlowa proposes a to establish a small scale mine at Karlowa mining claims No. 70459 and 70460 for the exploration of base metals and rare minerals and precious stones
Activity 9 Hazardous Substance Treatment, Handling and Storage	9.4 The storage and handling of dangerous goods, including petrol, diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of more than 30 cubic meters at any one location.	Storage and usage of diesel fuel for energy and powering the plant.

### 3.2.2. Environmental Management Plan (EMP)

In addition to the EIA scoping exercise, the Environmental Management Act stipulates that for each activity undergoing an EIA process, an Environmental Management Plan (EMP) should be developed.

The EMP outlines mitigation measures against specific steps, stages or processes of the proposed development. Thus, the EMP can be defined as the tool used to prevent / minimize the impacts identified during the EIA process. For accountability, the EMP outlines specific roles and responsibilities for the role-players, and non-compliance is punishable (EMP attached as Appendix 1).

### 3.3. Environmental Assessment Policy (1995)

The Environmental Assessment Policy for Sustainable development and Environmental Conservation emphasize the importance of environmental assessments as a key tool towards implementing integrated environmental management. It further sets an obligation to Namibians to prioritize the protection of ecosystems and related ecological processes.

The policy subjects all developments to environmental assessment and provides guideline for the Environmental Assessment. The policy advocates that Environmental Assessment take due consideration of all potential impacts and mitigations measures should be incorporated in the project design and planning stages (as early as possible).

### 3.4. Other Legal Requirements

In addition to the EMA and the Environmental Assessment Policy, there exists a host of other legal documents and guidelines that are relevant to the proposed activity and the proponent has the responsibility to ensure conformity thereof (*Table 3 below*).

Table 3 Other relevant legislation and applicability thereof

<b>Legal Requirements</b>		
<b>Legislation considered</b>	<b>Relevant authority</b>	<b>Aspect of Project</b>
<b>Pollution Control and Waste Management Bill (in preparation)</b>	<b>Ministry of Environment, Forestry and Tourism (MEFT), MHSS and others</b>	<p>The Pollution Control and Waste Management Bill, intends to regulate and prevent the discharge of pollutants into the air and water as well as providing for general waste management. Upon gazettment, the Bill will repeal the Atmospheric Pollution Prevention Ordinance (11 of 1976).</p> <p>The Bill also provides for noise, dust or odour control that may be considered a nuisance. Furthermore, the Bill advocates for duty of care with respect to waste management affecting humans and the environment and advocates for a waste management licence for any activity relating to waste or hazardous waste management.</p>
<b>Public Health Act (Act No. 36 of 1919)</b>	<b>Ministry of Health and Social Services</b>	<p>The Public Health Act aims to protect the public from nuisance and states that no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health.</p> <p>The proponent should ensure that the workers are provided with protective gear to safeguard their wellbeing. The activities should also be conducted in a manner that does not pose any danger to the general public and that any emissions which could be considered a nuisance should be contained at acceptable levels.</p>
<b>Atmospheric Pollution Prevention Ordinance (Act No.11 of 1976)</b>	<b>Ministry of Health and Social Services</b>	<p>This Ordinance serves to control air pollution from point sources. Any person carrying out a 'scheduled process' which are processes resulting in noxious or offensive gases typically pertaining to point source emissions have to obtain a registration certificate from the Department of Health.</p>
<b>Water Resources Management Act (Act No. 11 of 2013)</b>	<b>Ministry of Agriculture, Water and Land Reform (MAWLR)</b>	<p>This Act provides a framework for managing water resources based on the principles of integrated water resources management. It provides for the management, development, protection, conservation, and use of water</p>

## Legal Requirements

<b>Legislation considered</b>	<b>Relevant authority</b>	<b>Aspect of Project</b>
		<p>resources. Furthermore, any watercourse on/or in close proximity to the site and associated ecosystems should be protected in alignment with the listed principles.</p> <p>Water is one of the most important resources, and determinant factor for any development. Therefore, water abstraction should satisfy the provisions of the water act (water abstraction / borehole permit should be applied from the respective ministry).</p>
<b>The Occupational Safety and Health Act No. 11 of 2007</b>	<b>Ministry of Labour, Industrial Relations and Employment Creation (MLIREC)</b>	<p>This act provides a basis for ensuring and maintaining a safe working environment. It defines the role of the employer and employees in maintaining safety in the workplace.</p> <p>A safety risk is a statistical concept representing the potential of an accident occurring, owing to unsafe operation and/or environment. In the working context "SAFETY" is regarded as "free from danger" to the health injury and to properties.</p>
<b>Occupational Health</b>	<b>Ministry of Labour, Industrial Relations and Employment Creation (MLIREC)</b>	<p>Occupational Health is aimed at the promotion and maintenance of the highest degree of physical, mental and social wellbeing of workers in all occupations. This is done by ensuring that all work-related hazards are prevented and where they occur, managed. In order to maintain good and healthy standards, at the work place, cleanliness, adequate sanitary facilities, protection against dangerous substances as well as education and training of both workers and management is necessary.</p>
<b>Hazardous Substances Ordinance No. 14 of 1974</b>	<b>Ministry of Health and Social Services (MOHSS) Or MEFT</b>	<p>The ordinance is important for pollution control and provides for the control of toxic substances including their manufacture, use, sale, disposal, dumping, import and export in order to ensure human and environmental safety.</p>
<b>Soil Conservation Act No. 76 of 1969</b>	<b>Ministry of Agriculture, Water and Land Reform</b>	<p>This act promotes the conservation of soil, prevention of soil erosion. Typically, improper planning of construction can cause soil degradation and</p>

<b>Legal Requirements</b>		
<b>Legislation considered</b>	<b>Relevant authority</b>	<b>Aspect of Project</b>
	<b>(MAWLR)</b>	erosion.
<b>National Heritage Act No. 27 of 2004</b>	<b>Ministry of Education, Arts and Culture</b>	The Act makes provision for the protection and conservation of places and objects of heritage significance and the registration of such places and objects. Part V Section 46 of the Act prohibits removal, damage, alteration or excavation of heritage sites or remains, while Section 48 sets out the procedure for application and granting of permits.
<b>Regional Councils Act, 1992 (Act No. 22 of 1992)</b>	<b>Ministry of Regional and Local Government, Housing and Rural Development</b>	The Regional Councils Act legislate the establishment of Regional Councils that are responsible for the planning and coordination of regional policies and development. The main objective of this Act is to initiate, supervise, manage and evaluate regional development. The Regional Council is considered to be an interested and affected party (I&AP) and reserve the right to comment on the project and EMP.

### **3.5. Precautionary and Polluter Pays Principles**

#### **3.5.1. Precautionary Approach Principle**

This principle is worldwide accepted when there is a lack of sufficient knowledge and information about proposed development possible threats to the environment. Hence if the anticipated impacts are greater, then precautionary approach is applied.

#### **3.5.2. Polluter Pays Principle**

This principle ensures that proponent takes responsibility of their actions. Hence in cases of pollution, the proponent bears the full responsibility and cost to clean up the environment.

# CHAPTER 4

## 4. NAMIBIAN EIA FRAMEWORK

### 4.1. EIA Process

The EIA Process entails the assessment of the affected environment and identification of potential impacts. For each potential impact, mitigation measures are developed and incorporated into the EMP. Stakeholder consultation is an integral component of the EIA process (Figure 1).

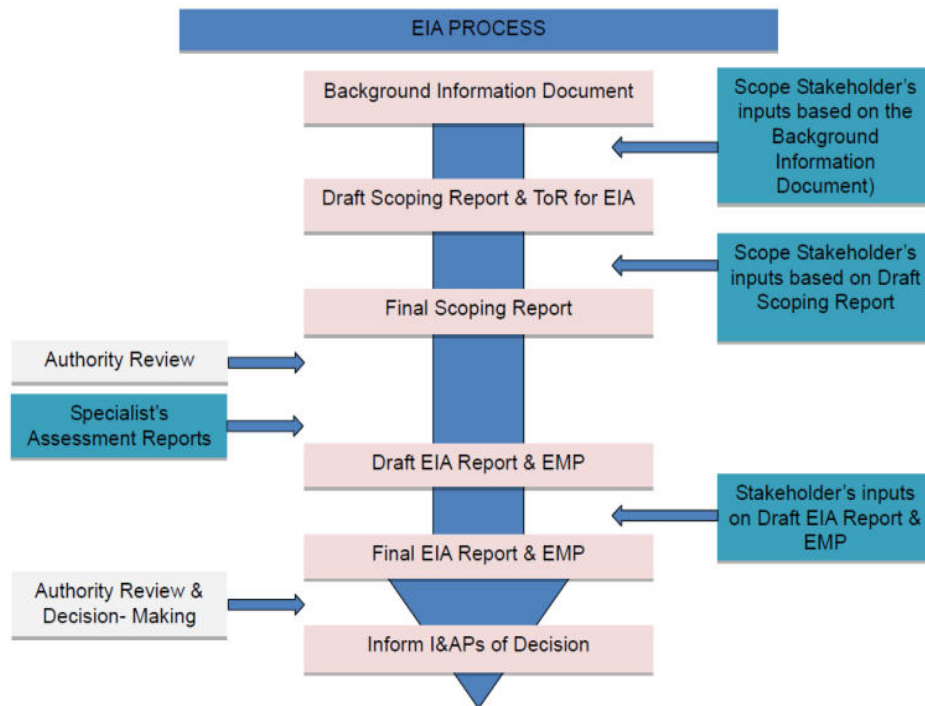


Figure 4: EIA flow diagram

The EIA process can aid the design and planning process and mitigation measures should be incorporated as early as the planning phase.



#### 4.1.1. Identification and Mitigation of Impacts

The backbone of the EIA process is the identification of impacts (whether real or perceived) and mitigation of negative impacts in accordance with the principles of environmental management to ensure an environmentally friendly development.

#### 4.1.2. EIA Scoping Exercise

This EIA Scoping Report presents the findings of the assessment and the potential impacts that may arise from the proposed project. The Environmental Management Act and EIA Regulations stipulates that an Environmental Impact Assessment (EIA) should assess the potential impacts (real or perceived) and recommend remedial measures necessary to mitigate the effects of the proposed activity.

The EIA should not only focus on mitigating the impacts of the activity during the active operations, but it should go further and recommend rehabilitation measures at project closure (when activities cease). Rehabilitation measures should not be parked waiting for project closure, but should be implemented incrementally throughout the project lifespan. Thus, the purpose of the EIA scoping exercise is to:

- a) Provide information on the proposed Activity;
- b) Describe the affected environment,
- c) Identify potential environmental and socio-economic impacts;
- d) Present issues and concerns raised by stakeholders, and explain how the issues will be addressed (Comments & Response Report – CRR);
- e) Recommend mitigation measures for each potential impact

## CHAPTER 5

### 5. AFFECTED ENVIRONMENT

#### 5.1. Site Setting and Surrounding Environment

The proposed mining and mineral processing operations site is situated MC No. 70459 and 70460 are located on a state lands some 20 north-west of Uis, Erongo region. The area is predominantly a mining field, with the earliest mining activities commissioned as early as 1922 and to date there are still numerous active mining operations in the area. Other prominent land uses for these are tourism and livestock farming (pastoral).

The area falls within the Tsiseb communal conservancy, a community-based organization, registered and regulated through the Ministry of Environment, Forestry and Tourism (MEFT). The conservancy is mandated with the management and conservation of its natural resources, onto which they subsequently have rights of utilization for their livelihood's betterment. Administratively, the area falls within the Daures constituency of Erongo region. Relatively flat gravel and grassland plains' landscape, with rolling distant hills and patches of bare granite domes, the area is home to the iconic Brandberg Mountain, towering at 2,573m and qualifying it as the highest point in Namibia.

#### 5.2. Climate

A perfect reflection of the country's aridity, Damaraland is a semi-desert, with dry and hotter climatic conditions. Here, the summer rainfall, which peaks in March rarely surpass a monthly average of 30 mm during the wettest month, with less than 20 days of rainfall/per year. November and December are the hottest month, during which temperature can soar way above 38°C.

#### 5.3. Geo-hydrology and Surface Water

##### 5.3.1. Geo-hydrology

The town of Uis has been supplied with water from the Nei-Neis aquifer, through various boreholes at the foot of the Brandberg Mountain. This aquifer has dried up on numerous occasions in the past, a direct result of lack of inflow into the Omaruru River with the scares rainfall that compromise recharge of the aquifer. This fueled a crisis and NAMWATER had to ferry water in with tankers which necessitated the

rationing of water. Given the desert climatic conditions, these alluvial aquifers drying up will be an ongoing challenge.

As for the water supply for mining purpose, existing mines in the vicinity have made use of the desalinated water from Erongo Desalination Plant between Swakopmund and Walvis Bay. Desalinated water is pumped from plant and piped to the mining sites through a network of pipelines. Planned mining activities at MC No. 70459 and 70460 envisage on using recycling water obtained from the reservoir.

### **5.3.2. Surface Water**

Uis Ephemeral River, a tributary of Ugab River transcends proposed mining area. It provides a lifeline service of recharging the alluvial aquifers in the area. However, in the face of dwindling rainfall, there have been repeated episodes of dried up aquifer, as they could not recharge at the rate of water abstraction, if not more.

The Ugab river catchment where the site is drains the runoff westward into the Atlantic Ocean. Given the role of groundwater recharge that these rivers provide, pollution needs to be managed in this catchment to avert the possibility of groundwater pollution.

## **5.4. Soil & Geology**

Geologically, Karlowa area lies within the Cape Cross–Uis pegmatite belt of Damaraland. Pegmatite is defined as coarsely, crystalline granite or other igneous rock with crystals several centimetres in length”. With its rich mineralisation, this type of rocks hosts economically important deposits of rare earth elements, lithium, niobium, tantalum, industrial stones, as well as gemstones.

The soil of Karlowa is characterised mainly Regosols and Leptosols. This means that the soil consists of unconsolidated mineral material of some depth, excluding coarse textured materials and materials with fluvic properties, and has no diagnostic horizons other than an ochric horizon.

## **5.5. Local Air Quality**

Mining is the main sources of air pollution emission in Uis. Other potential sources include opencast cast mine, traffic, road constructions on the road between Uis and Hentis Bay and unpaved roads, open areas exposed to wind, small scale industrial/commercial activities and the natural environment.

## **5.6. Noise Levels**

Traffic and the mining are the main sources of noise around Uis. Other minor localised sources include wild animals, birds and insects.

## **5.7. Cultural Heritage and Visual Amenity**

The constituency of Daures is rich with archaeological and paleontological resources. The rich geological and early habitation by the San, evolved into this archaeological endowment. This is specifically the vicinity of the Brandberg Mountain where rock painting and engraving visually paint a historic journey of the area and its first inhabitants. Special precaution should be taken, to protect this heritage, more so that the site has not been declared a heritage site as yet.

From the assessment, the proposed site is significantly distant from the declared heritage site and its activities will not interfere with it.

## **5.8. Biodiversity**

Nama Karoo biome defines the biodiversity profile in the proposed area. Further, being part of the Tsiseb communal conservancy, supporting a range of wildlife animal. Uniquely, the Brandberg massif has amassed a number of species diversity, with some being endemic to this area.

### **5.8.1. Fauna**

Karlowa Area falls under Tsiseb conservancy. Through the Tsiseb communal conservancy a healthy wildlife population of elephant, leopard, cheetah, mountain zebra, kudu, gemsbok, ostrich, springbok, steenbok, black-backed jackal, and klipspringer is under conservation. This is also home to a population of black rhino, currently classified as a critically endangered species. Given that the proposed project will draw additional people into Uis, it could have an effect on poaching.

### **5.8.2. Flora**

Being a desert ecosystem, vegetation around the site is characterized by Nama Karoo biome, comprised of flat plains of scattered shrubs and grasslands. It is a range to thick-stemmed trees of the Commiphora species and the succulent Euphorbias species (*Damara*, *Verosa* and *Mauritania*). Special assessment emphasis

for the Acacia trees tree such as *Acacia erioloba* and *Faidherbia albida* tend along the river banks, which serve as critical nutritional sources for both livestock and wildlife.

## 5.9. Socio-economics

Uis is small settlement in Erongo Region established in 1958 as a mining town. The town has a population of 3600 people. The settlement holds a small supermarket, guesthouses and a rest camp, a bakery and a petrol station, together with a few other small shops. There is only 1 primary and 1 secondary school and both schools accommodate 300 learners. The Secondary school's infrastructure is dilapidated as it was constructed pre independent era.

Until 2010 the settlement was on the verge of becoming a ghost town but the growing demand of mineral deposits such as tin, lithium and tantalum, Uis is back. The main key economic activities of Uis are mining and tourism. Being situated on C35 road, the town has a fair amount of traffic to support the current economic activities.

Table 4 below summarizes Uis settlement socio-economic outlook and presents an opportunity on how the project at Karlowa's mining claims can contribute the overall development of the town. For instance, project could provide preferential employment to both unskilled and qualified skilled labour in order to offset the overall unemployment in Uis and boost household income.

*Table 4: Uis Socio-economic Outlook*

<b>UIS SETTLEMENT DEMOGRAPHIC PROFILE</b>	
<b>Socio-economic characteristic</b>	<b>Description</b>
Type	Settlement
Constituency	Daures
Region	Erongo
Population	3600 people
Area coverage (km <sup>2</sup> )	10.0
Population density (inhabitants per km <sup>2</sup> )	149.1
Main Tribes	Damara & Herero
Most spoken language(s)	Damara-nama, Afrikaans, Otjiherero
Main Religion	Christians

Key economic activities	Tourism, small scale mining, agriculture (livestock farming)
<b>Daures Constituency Averages</b>	
No. of Households	900
No. of people per household	3.8 ~ 4
Head of households (%)	
Female	40
male	60
Sex ratio: Males per 100 females	1:114
Male. Population (%)	48.7
Female. Population (%)	51.6
<b>Life Expectancy (Highest age)</b>	
Male. Life Expectancy	63
Female. Life Expectancy	67
Literacy rate, 15+ years, (%)	80.3
<b>Education Level, 15+ years (%)</b>	
Never attended	20
Currently at school	8
Left school	69
Not accounted	3
<b>Labour forces (%)</b>	
In labour force	66
Employed	56
Unemployed	44
Outside labour force	29
Household main source income (%)	
Farming	24
Wages, Salaries	28
Cash remittance	11
Non-farming , Business	9
Pension	24
Birth Rate (crude birth rate) per 1000	22.6
*Death rate (%)	
Male	52.7
Female	47.3
Main population access to ICT	Radio, Television, Cellphone and Newspapers

Data extracted from: (Erongo Region population & household census profile, 2011)  
*\*regional average*

## CHAPTER 6

### 6. IMPACT ASSESSMENT METHODOLOGY

#### 6.1. Assessment of Impact Significance

The significance of an effect is determined by taking into consideration the combination of the sensitivity or importance/value of the baseline conditions and the magnitude of potential change (or impact from an activity).

The magnitude of change (the impact) is identifiable changes to the existing environment which may be direct or indirect; short term/temporary, medium term or long term/permanent; and either beneficial or adverse.

To ensure this assessment is consistent and comparable with other environmental assessments undertaken for the smelter site, similar criteria ratings have been applied for sensitivity, magnitude of change and significance of effect. This method complies with the EIA Regulations.

The environmental assessment is undertaken and presented by topic / receptor and not by activity within the proposed project.

*Table 5: Sensitivity or importance/value of receptor*

High	Of value, importance or rarity on a national scale, and with very limited potential for substitution; and/or Very sensitive to change, or has little capacity to accommodate a change.
Medium	Of value, importance or rarity on a regional scale, and with limited potential for substitution; and/or Moderate sensitivity to change, or moderate capacity to accommodate a change
Low	Of value, importance or rarity on a local scale; and/or Not particularly sensitive to change, or has considerable capacity to accommodate a change.

## Magnitude of change

Table 6: Severity of effect

High	Loss of resource and quality of resource, sever damage to key characteristics, features or elements.
Medium	Loss of resource, but not adversely affecting its integrity; partial loss of/damage to key characteristics, features or elements
Low	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (or maybe more) key characteristic, feature or element
Low+	Minor benefit to, or addition of, one (or maybe more) key characteristic, feature or element; some beneficial effect on attribute quality or a reduced risk of a negative effect occurring.
Medium+	Benefit to, or addition of, key characteristics, features or elements; improvements of attribute quality.
High+	Large scale or major improvement of resources quality; extensive restoration or enhancement; major improvement of attribute quality

Table 7: Duration of effect

High	Long term effects (6-10 years) / permanent effects (>10 years) / irreversible
Medium	Medium term (0-5 years) / reversible over time
Low	Short term (<18 months) / temporary effects

Table 8: Probability of effect

High	Definite: The effect will occur
Medium	Possible: Likely chance of the effect occurring
Low	Unlikely: Very low chance of the effect occurring

## Determination of Significance

Significance is not defined in the EIA Regulations, however the Draft Procedure and Guidance for EIA and EMP states the significance of a predicted impact depends upon its context and intensity. Accordingly, the following have been applied in the environmental assessment, which is based on professional judgement:

- **High:** effects are considered to be key factors in the decision-making process. These are generally (but not exclusively) associated with sites and features of national importance and resources/features that are unique and which, if lost, cannot be replaced or relocated.



- **Medium:** effects are considered to be important factors but which are unlikely to be key decision-making factors.
- **Low:** effects are considered to be local factors that are unlikely to be critical to decision-making.

The significance of effect has been derived by applying the identified thresholds for receptor sensitivity and magnitude of change, as well as the definition for significance.

For each potential significant effect identified in the assessment, a summary is provided which includes the activity that would cause an impact; the potential effect; embedded or best practice mitigation; the sensitivity of receptor that would be impacted; the severity, duration and probability of effect; the significance of effect before mitigation and after additional mitigation. A summary table (see Table as an example) is also providing for each potential significant effect.

*Table 9: Summary of impact assessment*

Receptor	Effect	Sensitivity	Severity	Duration	Probability	Significance before additional mitigation	Significance after additional mitigation
Soil	Spread of contamination	L	M	M	L	M	L

If effects of high significance are identified, the effects are considered to be significant. A further detailed EIA would be deemed appropriate for these effects, to further understand the consequences (through modeling or other assessment techniques) and required mitigation measures to reduce the effect.

## 6.2. Environmental Mitigation

Mitigation comprises a hierarchy of measures ranging from preventative of environmental effects by avoidance, to measures that provide opportunities for environmental enhancement. The mitigation hierarchy is: avoidance; reduction; compensation; remediation; and enhancement.

Embedded mitigation, which is part of the design, and good practice mitigation are taken into consideration during the scoping process and through the initial assessment of magnitude and determination of significance. Additional mitigation is reduced. A final assessment of significance of effects is carried out taking into consideration the additional mitigation.

### **6.3. Cumulative Effects**

The EIA Regulations clearly states that cumulative effects should be considered as part of the EIA for a proposed project (Listed Activity). Cumulative effects can arise when a single resource or receptor is affected by more than one effect from the proposed project or from the combination of the proposed project and other development projects within the local area / area where combined effects can occur. For example, a local resident could be affected by noise or dust during the construction phase. In isolation, the effects may be insignificant, however when combined, the effects may result in a significant effect on that receptor.

As discussed in Chapter 1, the proposed project is part of a wider optimization project for the mine and processing plant. It is therefore recognized that there is potential for cumulative effects to arise both within the proposed project (intra-project – combined effects from the proposed project on a receptor), but also within the wider project (inter-project – combined effects of two projects on the same receptor). For example, the noise generated during the construction phase of the proposed project may not cause a significant effect in isolation; however, a sensitive receptor may be significantly affected when noise from the proposed project is combined with noise generated from other construction projects across the site.

The assessment of cumulative effects is undertaken by receptor rather than by topic or activity. There is no formal guidance for cumulative impacts presented and therefore professional judgment is used for the assessment.

### **6.4. Uncertainty, limitations and assumptions**

The following uncertainties, limitations and assumptions have been applied to the environmental scoping and assessment process:

- Baseline data was obtained through a desk-based review which relied upon existing published data and has not been corroborated;
- Cumulative assessment is based on the information presented at hand and lacks specific details related to the magnitude, designs and plans of the plant.
- Lack of construction methodology has led to a number of assumptions being made in the assessment. These are defined where applicable; and
- Lack of details on the operational plan.;

- Fencing of the area around the plant.

## **6.5. Project Phases**

### **6.5.1. Construction**

#### Overview

Construction would involve different combinations of the following activities:

- Setting up and assembling a 3 stage crushing and flotation plant
- Construction of the diesel storage tank
- Construction of the ablution facilities and office space
- Construction of the employees housing
- Site clearance (removal of existing vegetation) for processing plant
- Fencing of the area around the plant.

All construction works, upgrades and new infrastructure will occur within the site boundary.

#### Plant, Equipment and Machinery

Plant, equipment and machinery that would be used during the construction phase include excavator, front end loaders, side tipper trucks and ATD trucks. Areas will have restricted access and clearly marked. Stockpiles of construction materials and excavated materials may be required.

### **6.5.2. Operations**

The following operational and maintenance activities are expected to occur following the completion of construction:

- Blasting and drilling
- Reef exposure and preparation.
- face clean-up ( mobile conveyors)
- material feed to the Mobile plant
- Material Commutation ( crushing, jaw, and roll)

- Screening and sizing of material
- magnetic separation
- Air separation and sizing
- Dirty concentrate to the flotation plant

### 6.5.3. Decommissioning

The decommissioning of the proposed project will be part of the overall site decommissioning plan. The design of the proposed project will take into consideration decommissioning so that the generation of waste is minimized and other environmental effects are minimized.

## CHAPTER 7

### 7. IMPACT ASSESSMENT

#### 7.1. Introduction

This chapter presents the findings of a high-level assessment of those topics / receptors which could result in a significant environmental effect from the proposed project. The assessment is in line with the methodology presented in Chapter 6.

A list of potentially significant effects and other likely environmental effects that should be considered during the construction and operation of the proposed project in order to reduce adverse effects and minimize pollution (considered best practice) are contained in the EMP along with mitigation measures.

#### 7.2. Surface Water and Groundwater

##### 7.2.1. Surface Water Quality: Operation

###### Oil spillage and contamination: Surface water

**Assumption** - as a worst-case scenario, it is assumed spilled oil and other contamination could be washed into the river during rainy season.

Operation of heavy vehicle machinery, tailing waste generating and storage of water on site could be problematic during the rainy season. As it could lead to soil contaminations and eventually end up into the river. There is a risk that contaminants could be discharged in to surface water bodies and end up Ugab River.

Contaminated soil remediation and tailings management procedures would be in place to mitigate the possible contamination. Special care should be taken into consideration during the rainy season.

##### 7.2.2. Soil Quality: Operation

###### Vehicle, Equipment and storage of diesel on site related activities

Activities related to operating of vehicles & mining equipment's on site, storage of diesel fuel on site are possible sources of soil contaminations. The grease, oil from these sources could pollute the soil. There is potential to disturb existing ground

causing contamination to enter the environment and affect groundwater, particularly during rainfall events.

Regular inspections, implementing monitoring and remediation procedures could be implemented in order to identify, prevent and rehabilitate contaminated ground. Procedure related to major ground contamination of more than 2000 should be handled in accordance to the law.

Table 10: Potential effects on soil

Receptor	Effect	Sensitivity	Severity	Duration	Probability	Significance before additional mitigation	Significance after additional mitigation
Soil ground	Ground Contamination	M	M	L	M	M	XX

### 7.3. Cumulative Effects

#### 7.3.1. Groundwater

There is potential for groundwater quality to be affected as a result of the oil contamination and also leaching of the tailings. These aspects could cause contaminated water to seep into the ground, which could reach groundwater and pollute the aquifer over a period of time.

Currently there are no existing boreholes on site. Monitoring boreholes should be constructed and monitored to determine the baseline quality of water. Periodic monitoring should also be implemented in order to determine the significance and impacts of the mining activities to cause significant cumulative effect.

#### 7.3.2. Occupational Health Safety

Working prolonged hours in the heat, exposure to mining dust during crushing and processing of the ore could be detrimental to the human health.

- **Heat:** prolonged exposure to heat during working hours could cause severe heat stress and dehydration as well dizziness.
- **Dust:** exposure to silica dust from ore crushing as well as dust during blasting could cause lung disease and cancer to the exposure employees.

- **Vibration:** Operating trucks and vibrating moving equipment's for more than 6hrs without breaks could cause chronic belly hanging, vibration syndrome and Raynaud's phenomenon.
- **Noise:** Prolong exposure to noise beyond 85dB or 120dB on short term could lead to noise impairment and other hearing defects

### 7.3.3. Underground water Aquifer

The commercial abstraction from Nei-Neis water aquifer can contribute to the reduction of the water levels. The aridity of Uis and severity of water scarcity in the town due to climate change could lead worsen the situation.

The burden on the aquifer by existing activities in the area has caused the aquifer to dry up on numerous occasions.

Table: 11: Project Impact Analysis Summary

No	Effect	Contributing Activities	Project phase	Sensitivity	Severity	Duration	Probability	Significance before additional mitigation	Significance after additional mitigation
1.	Cancer and pulmonary health conditions	Prolonged exposure to mining related silica dust during crushing, blasting, and from mining vehicles and machinery	operation & decommissioning	L	L	L	H	H	L
2.	Vibration syndrome including vibration white finger and as Raynaud's phenomenon	Exposure to whole body vibration and long-term usage of vibrating equipment.	Operation	L	M	M-H	M	H	L
3.	Attacks by wild animals Human wildlife conflict	Direct confrontation and housing near the mining area.		M	L	L	L	L	L
4.	Noise induced hearing losses	Long term exposure to machinery noise	Operation	L	H	M-H	H	H	M
5.	Fatality and related deaths	Resulting from, machine electrocution, falling from heights, drowning, etc	Operation	L	H	H	H	H	M
6.	Accidents	Caused by minor, near misses and major hazards on site. Eg. Operating machinery without locking out & working at heights without safety harness.	Operation	L	H	M	H	H	M
7.	Physical injuries eg. Burns	Repetitive machine handling, falling stones, handling of chemicals	Operation	L	L	L	H	H	M
8.	Stress (heat stress, and physical stress)	Long term exposure to working hours while its hot, exposure	Project lifecycle	L	M	L	H	H	M



9.	Cumulative Trauma disorders, post traumatic disorder and psychological problems	Resulting from witnessing fatality or death of a colleague and overworking	Operation	M	M	M	M	H	M
10.	Drug and alcohol abuse	Workplace related stress	Life cycle	L	M	L-M	M	M	M
11.									
12.	Disease				M	M	M	M	M
14.	Soil contamination	Oil spillage related pollution		L	M	L	M	M	M
15.	HIV/AIDS	Resulting from lonely and remote working away from families and loved ones	Life cycle	H	L	L	M	M	M
16.	Contamination and pollution of the aquifer soil	Resulting from oil spillage and tailings chemicals leakage or leaching into the ground or washes away chemical during the rainy season	Operation	L	M	M	M	M	M
17.	Depletion of aquifer water levels	Due to high volumes of water abstraction for processing from the Nei-Neis water aquifer	Operation	M	L	H	M	M	M
18.	Loss of vegetation	Clearing of land for the construction of mining operation	Construction	M	L	H	L	L	L
19.	Destruction of heritage resources	Discovered of heritage material during construction	Construction	M	L	M	L	L	L
20.	Human wildlife conflict	Attacks by wild animals, disputes	Operation	M	L	L	L	L	L
21.	Visual/scenic pollution	Construction of the plant and accommodation, land clearing, dust, littering	Construction, Operation	L	L	L	H	M	M
22.	Littering & waste pollution	Waste generated on site, tailing mismanagement	Project life cycle	L	M	L	H	M	M
23.	Natural catastrophe	malfunctions due to unreliable working tailings, blasting		M	M	L	M	M	M
24.	Air pollution	Dust, emission during crushing, blasting		L	M	L	M	M	M

25	Employment creating	From project activities	Project lifecycle						
26	Loss of wildlife	Due to destruction of habitat due to the construction and operation of the mining activities		H	H	H	H	M	L
27	Town development	Building of the employees housing facility	Project lifecycle	L	L	H+	H+	H	L

## CHAPTER 8

### 8. CONCLUSION AND RECOMMENDATIONS

#### 8.1. Conclusion

The environmental assessment concludes that the activities related to the exploring activities at Karlowa Mining Enterprise will trigger impacts as a result of the construction and operation of small scale mining. If such activities are not managed, the project will result in detrimental environmental and occupational health and safety impacts.

Therefore, Karlowa Mining should conduct its activities in compliance with the recommended management modalities, in compliance with the Namibian legal framework, in order to mitigate the potential identified short, medium and long term impacts. To mitigate and manage the identified impacts, the assessment team proposes these specific mitigation and management measures to be applied during construction, operational and decommissioning phases of the proposed project as presented in the EMP attached.

#### 8.2. Recommendations

Gwayela Environmental Solutions has no doubt and hereby strongly recommends approval and issuance of the Environment Clearance Certificate before the commencement of proposed project.

It is recommended that the subject of the Environmental Clearance Certificate be: **ENVIRONMENTAL CLEARANCE CERTIFICATE FOR KARLOWA MINING ENTERPRISES' EXPLORATION AND SMALL SCALE MINING ACTIVITIES AT MINING CLAIMS NO. 70459 AND 70460 IN UIS, ERONGO REGION.**

EIA Consistency: For compatibility and cohesion, it is recommended that a consistent EIA methodology should be adopted and applied to future EIAs. If the EIAs are not compatible, the significance of environmental impacts could be interpreted differently. As a result, some EIA and EMP reports may overlook or misinterpret important elements, whilst others may be overly precautions.

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