

## Environmental Scoping Assessment (ESA) Report for the:

**Proposed Exploration of Base and Rare Metals, Dimension Stones, Industrial Minerals and Precious Metals on EPL 8786 Witvlei area, Okarukambe Constituency, Omaheke Region – Namibia.**

<b>MEFT APPLICATION NO.:</b>	<b>APP - 00834</b>
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<b>DATE SUBMITTED:</b>	March 2023
<b>DOCUMENT VERSION:</b>	<b>Final for MEFT Evaluation</b>
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## EXECUTIVE SUMMARY

Ms Olivia Itaveleni Shuuluka (hereinafter referred to as the Proponent), is the sole holder of Exclusive Prospecting License (EPL) 8786 (the EPL) and intends to undertake exploration and prospecting of Base and Rare Metals, Precious Metals, Dimension Stones and Industrial Minerals. The EPL 8786 is located about 40km northwest of Gobabis an about 20km north of Witvlei in Omaheke Region, in Okarukambe Consituency. The EPL 8786 has an area of 19419.9849Ha and it primarily covers the following Farms: Ongava Onuea 147, Okasandu 158, Gottesgabe 159, Herzwolde B, Pack Grunental 1031, Okatjirute West, Daheim Okatjepuiko1032, Sudan 69, Wonderboom 301, and has small overlaps with Farms Lee Enfield 303, Delvile 146, Mex 145, and Spandau 149. The area with the EPL 8786 can be accessed via the B6 Trans Kalahari Highway to Witvlei, and onto D1663 gravel road.

The proposed exploration works are among the listed activities in the Environmental Management Act (EMA) No. 7 of 2007 and its 2012 Environmental Impact Assessment (EIA) Regulations that may not be undertaken without getting an environmental clearance certificate (ECC). Consequently, Ms Olivia Itaveleni Shuuluka appointed OMAVI Geotechnical & Geo-Environmental Consultants CC (hereinafter referred to as OMAVI) to undertake the required Environmental Scoping Assessment process and apply for the ECC for the proposed project activities.

It is for this reason, that this Environmental Scoping Assessment (ESA) Report was compiled. The Report contains all the information that was gathered from the environmental assessment process. This includes description of the proposed project activities and alternatives, legal requirements, the pre-project environmental conditions, public consultation means, identified potential impacts (both by the Consultants and registered interested and affected parties), their assessment and provision of the necessary practical measures to manage avoid and or minimize each impact' significance.

### **Public consultation, Key issues Raised and Identified Potential Impacts**

The public consultation process took place from the 20th January 2023 to 20 February 2023. The public was informed of the ESA process and consulted through the following means:

- The public was informed via the newspapers (*Die Republikein*, *Namibian Sun* and *Allgemeine Zeitung* for two consecutive weeks on 20th and 26th January 2023,).
- Site/public notices were placed at strategic localities including the Omaheke Regional Council headquarter offices in Gobabis, Okarukambe Constituency office, Nampost office, and Municipality in Gobabis, at the settlement offices, Nampost and public clinic in Witvlei as well as along the D1663 that goes to the EPL
- Individual farmers and essential entities outside Windhoek received registered mail and submitted their concerns via email.

### **Issues and concerns to the proposed project: Public (I&APs) Feedback**

The main issues (potential negative impacts) that were raised during the public consultation process are as follows:

1. Potential impact of radiation exposure from exploration of nuclear fuel minerals. This is out of the scope of present exploration works as nuclear fuels are not targeted.
2. Suggestion to employ airborne surveys to make the exploration programme more beneficial.

The base and rare metals which are the main minerals sought after in this project are of great importance in commercial and industrial applications. They are essential raw materials to end-user industries such as construction, automotive and transportation, electrical and electronics, consumer products, medical devices, etc. With the fourth industrial revolution on the horizon, there is an increasing demand for these minerals and the need to maintain the current consumption pattern requires constant search for new deposits or studies to expand exploration reserves. This will make Namibia a big role player in the supply of such material, which will also contribute to the GDP and growth of the economy. This exploration programme will not only provide employment opportunities to the Okarukambe Constituency, but it will also allow acquisition of skills through on-the-job training as well as a good understanding of the geology of Kalahari Copper Belt from the data to be acquired.

However, the project also has the potential to negatively impact the receiving environment. Impacts identified were assessed by considering the potential risk areas associated with the receiving biophysical and social environment in combination with issues raised during the public consultation process. The key impacts considered are as follows:

- **Physical land / soil disturbance:** Activities such as movement of heavy vehicles and invasive exploration techniques such as drilling may cause soil disturbance.
- **Impact on local biodiversity (fauna and flora):** the removal of vegetation and land clearing for minor access roads and temporary camps can potentially lead to disturbance of soils or land which can cause loss of vegetation. Removal of site rocks in the process may lead to loss of habitats for small animal species like reptiles that live under these rocks. Movement of heavy project vehicles may disturb the local livestock and wildlife around the project site. Loss of wild life to poaching due to presence of exploration workforce.
- **Soil and water resources pollution:** the potential risk of hydrocarbon spillages, drilling fluids, wastewater in the working areas and workshops if not properly managed may contaminate the site soils and eventually reach groundwater systems.
- **Impact on service infrastructure such as local roads:** the temporary potential increase in vehicular traffic during exploration may exert additional pressure on the local roads, especially by heavy vehicles such as trucks carrying project materials, equipment (drilling rig).
- **Air quality issue:** potential dust generated from project vehicles and activities such as drilling could compromise the surrounding air quality.
- **Noise:** potential increase in noise levels from project vehicles and machinery may be a nuisance to the locals.
- **Visual / aesthetic impact:** the presence of project vehicles and equipment in the area may be an eyesore to travellers (including tourists).
- **Environmental pollution/littering** by different types of waste generated on the site if not properly management or disposed.
- **General social nuisance to landowners:** Potential trespassing by the project personnel. Poor communication between the Proponent and the occupier of land with regards to the project activities could result in long-terms unresolved conflicts.

- **Impacts the health and safety of workers** – from the handling of equipment and use of machinery as well as potentially contracting diseases. This section includes fire management.
- **Social nuisance:** potential influx of people from outside the project area who might have different norms and values.

The significance of these impacts has been assessed in terms of the scale, duration, intensity or magnitude as well as probability of occurrence. All impacts were assessed in Section 6.3, and were found to be of medium significance. Mitigation measures were recommended in the scoping report so that the significance of impacts that cannot be avoided is reduced from medium to low rating. The mitigation measures are outlined in the EMP for implementation by respective parties to manage these impacts.

### **Conclusions and recommendations**

Based on this assessment and the information provided in this report, OMAVI is confident that the identified risks associated with the project can be reduced to acceptable levels, if the measures recommended in the EMP are implemented. However, to maintain a low significance rating, monitoring of the potential impacts by the Proponent (an Environmental Control Officer (ECO)) is highly recommended. **Monitoring will not only be carried out to maintain the low rating of impacts' significance but also to ensure that new potential impacts that might arise during project implementation are well identified in time, properly addressed and that suitable mitigation measures are provided and implemented.**

It is therefore recommended that an Environmental Clearance Certificate be issued for the proposed exploration on EPL 8786, provided that the EMP is implemented, and subject to the following recommendations:

- All required permits, licenses and approvals for the proposed activities should be obtained as required (please refer to the Permitting and Licensing Table in the Environmental Management Plan (**Appendix C**)). These include permits and licenses for land/farm access agreements to explore and ensuring compliance with these specific legal requirements.
- The Proponent complies with the legal requirements governing this type of project and its associated activities.
- All mitigations provided in this ESA Report and the management action plans in the EMP should be implemented and monitoring conducted as recommended.
- All the necessary environmental and social (occupational health and safety) precautions provided should be adhered to.
- Site areas where exploration activities have ceased should be rehabilitated, as far as practicable, to their original state.
- The monitoring of the implementation of mitigation measures should be conducted, applicable impact's actions taken, reporting done and recorded as recommended in the Draft EMP.

In conclusion, it is unlikely that the proposed project activities will have significant negative impact on the biophysical and social environments in the project area. Therefore, it is vital for the Proponent and their contractors (if any) to effectively implement and monitor the recommended management measures to protect the environment and promote environmental sustainability.

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**LIST OF ABBREVIATIONS**

CFP	Chance Finds Procedure
DEAF	Department of Environmental Affairs and Forestry
DDH	Diamond Drill Hole
DTH	Down-The-Hole drilling
DWA	Department of Water Affairs
EA	Environmental Assessment
EIA	Environmental Impact Assessment
ECC	Environmental Clearance Certificate
EMP	Environmental Management Plan
EMA	Environmental Management Act
EPL	Exclusive Prospecting Licence
ESA	Environmental Scoping Assessment
GWAUP	Groundwater Abstraction and Use Permit
I&APs	Interested and Affected Parties
MEAC	Ministry of Education, Arts and Culture
MAWLR	Ministry of Agriculture, Water & Land Reform
MEFT	Ministry of Environment, Forestry and Tourism
MME	Ministry of Mines and Energy
NHC	National Heritage Council of Namibia
NCAA	Namibia Civil Aviation Authority
RC Drilling	Reverse Circulation Drilling

## 1 INTRODUCTION

### 1.1 Project Background and Location

Ms Olivia Itaveleni Shuuluka (hereinafter referred to as the Proponent), is the sole holder of Exclusive Prospecting License (EPL) 8786 (the EPL) and intends to undertake exploration and prospecting of Base and Rare Metals, Precious Metals, Dimension Stones and Industrial Minerals. The EPL 8786 is located about 40km northwest of Gobabis and about 20km north of Witvlei, in Okarukambe Consituency, Omaheke Region as seen in **Figure 1-1**. The EPL 8786 has an area of 19419.9849Ha and it primarily covers the following Farms: Ongava Onuea 147, Okasandu 158, Gottesgabe 159, Herzwolde B, Pack Grunental 1031, Okatjirute West, Daheim Okatjepuiko1032, Sudan 69, Wonderboom 301, and has small overlaps with Farms Lee Enfield 303, Delvile 146, Mex 145, and Spandau 149 (**Figure 1-2**). The area with the EPL 8786 can be accessed via the B6 Trans Kalahari Highway to Witvlei, and onto D1663 gravel road. The map in **Figure 1-1** below shows the location of the EPL 8786 and **Figure 1-2** farms covered, while **Table 1-1** summarises the approximate corner coordinates of the EPL.

Table 1-1: Approximate GPS Coordinates of the corners of EPL 8786.

<b>EPL 8786</b>	<b>Latitude</b>	<b>Longitude</b>
<b>A</b>	22° 13' 35"	18° 25' 49"
<b>B</b>	22° 07' 46"	18° 31' 29"
<b>C</b>	22° 08' 47"	18° 33' 00"
<b>D</b>	22° 10' 32"	18° 32' 42"
<b>E</b>	22° 10' 34"	18° 35' 47"
<b>F</b>	22° 09' 41"	18° 36' 47"
<b>G</b>	22° 09' 36"	18° 40' 49"
<b>H</b>	22° 15' 35"	18° 39' 49"
<b>I</b>	22° 13' 49"	18° 34' 33"
<b>J</b>	22° 14' 18"	18° 33' 05"





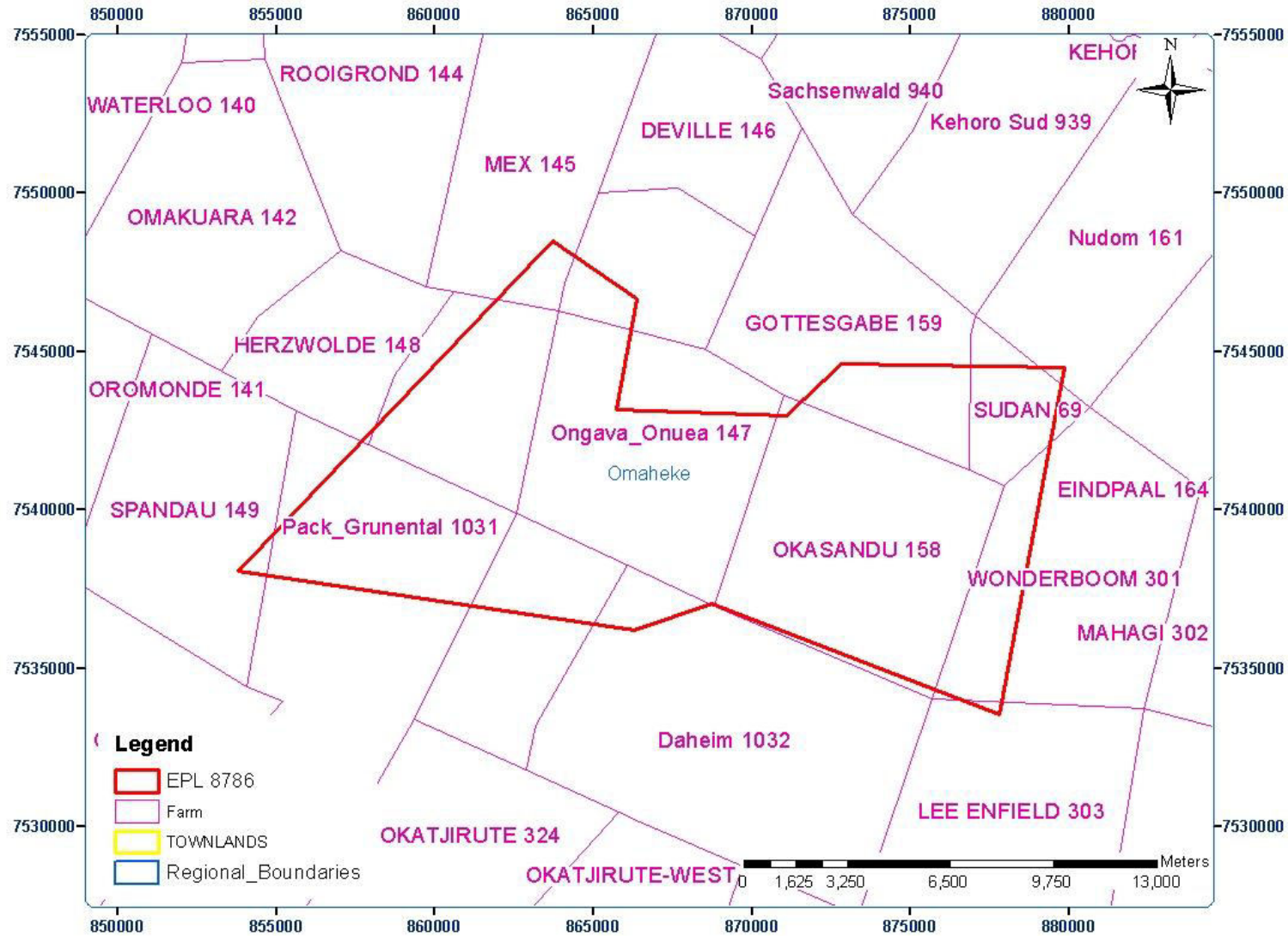


Figure 1-2: The The farms that are covered by EPL 8786, including ones with minor overlaps..

## 1.2 Ownership of the EPL 8786

Ms Olivia Itaveleni Shuuluka has applied to the ministry of Mines and Energy (MME) to be granted the Exclusive Prospecting Licence (EPL) 8786. The current status of this licence is "Pending ECC", which implies that granting of the licence is subject to the issuance of an environmental clearance certificate (ECC) by the Ministry of Environment, Forestry and Tourism (MEFT), hence the present environmental scoping assessment, to inform the ECC decision. Upon granting of the ECC, Ms Shuuluka will work with a third-party partner who may render financial and technical support for successful implementation of the proposed exploration works.

The status of EPL 8786 is shown in **Error! Reference source not found.** below as accessed on 31 January 2023 on the Namibia Mining Cadastral Portal (upon searching the licence number) on this link <https://portals.landfolio.com/namibia/>.

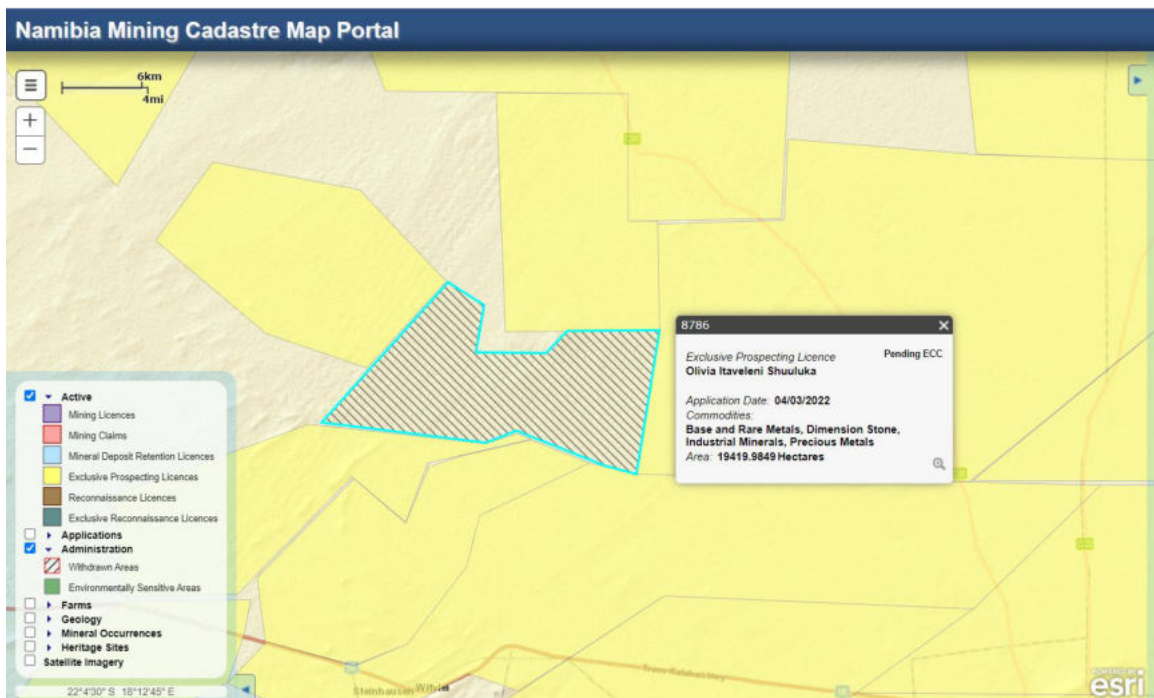


Figure 1-3: Details of EPL 8786 as displayed on the Namibia Mining Portal (As accessed on 31 January 2023 via: <https://portals.landfolio.com/namibia/>).

## 1.3 Project Justification

Mineral resources are increasingly assuming a strong importance for the maintenance, development and economic growth of the population. Base and rare metals such as copper, zinc, lead, nickel, aluminum, and tin (which are the main minerals sought after in this project) are of great importance in commercial and industrial applications. They are essential raw materials to end-user industries such as construction, automotive and transportation, electrical and electronics, consumer products, medical devices, etc. Therefore, the increasing demand for mineral substances and the need to maintain the current consumption pattern requires constant search for new deposits or studies to expand exploration reserves (Moreira et al., 2021).

In order to meet the demand and consumption needs of these industries, it is important that the exploration and mining of base metals continues in Namibia. This will ensure that Namibia is a role

player in the supply of these essential metals and contribute to industrial revolution. Additionally, exploration works have been encouraged in the Namibian Mineral Policy, whose mission is to “*further attract investment and enable the private sector to take the lead in exploration, mining, mineral beneficiation and marketing*”. It is against this background that Ms Olivia Itaveleni Shuuluka, decided to pursue the project under review.

Furthermore, implementation of this project could see additional benefits being realised. This includes the potential of the project to equip the local communities with technical skills as well as create job opportunities, which in turn can improve the socio-economic standing of the Okarukambe and nearby constituencies. Other benefits include regional and national socioeconomic benefits in terms of capital investments, license and rental fees, royalties and various taxes payable to the Government.

#### **1.4 The need environmental assessment process**

The Environmental Management Act (Act No. 7 of 2007) (EMA) and its 2012 EIA Regulations lists activities that must not be undertaken without an Environmental Clearance Certificate (ECC). The following sections are relevant to the proposed exploration works:

- **Activity 3.1 (Mining and Quarrying Activities):** *The construction of facilities for any process or activities which requires a license, right or other form of authorisation, and the renewal of a license, right or other form of authorisation. This bears relevance to the concerned project because the planned activities may entail the installation and construction of temporary exploration camps, access tracks and platforms.*
- **Activity 3.2 (Mining and Quarrying Activities):** *Other forms of mining or extraction of any natural resource whether regulated by law or not. This bears relevance to the concerned project because soil and rock material will be extracted from within the license area’s footprint in the form of soil samples for geochemical analysis, rock core, and possible aggregates from old mine workings.*
- **Activity 3.3 (Mining and Quarrying Activities):** *Resource extraction, manipulation, conservation, and related activities. This bears relevance to the concerned project because mineral resources will be extracted from within the license area over the prospecting stage duration.*
- **Activity 8.1 (Water Resources Development):** *The abstraction of ground or surface water for industrial or commercial purposes. This bears relevance to the concerned project because either ground and/ or surface water would be abstracted from existing water supply sources for exploration drilling.*
- **Activity 10.1 (Infrastructure development):** *The construction of public roads and motor vehicle tracks. This bears relevance to the concerned project because access tracks for vehicles and drilling rigs may be created where existing tracks cannot be used.*

To satisfy these conditions and to inform the ECC decision, an Environmental Scoping, or Impact Assessment (ESA/EIA) must be conducted, to understand how the planned project activities will interact with the current and future biophysical and socio-economic environment and compile an environmental management plan (EMP) to provide practical impact management measures for all significant impacts. It for this reason that Ms Olivia Itaveleni Shuuluka, appointed an Environmental Assessment Practitioner (EAP) to carry out this assessment.



## 1.5 The Environmental Assessment Practitioner

Ms. Olivia Itaveleni Shuuluka (the proponent) appointed OMAVI Geotechnical & Geo-environmental Consultants CC (OMAVI hereafter) as an independent environmental consultant, to investigate the potential biophysical and socio-economic environmental impacts that would arise from the proposed exploration activities. The findings of the scoping assessment are aimed at providing the Ministry of Environment, Forestry and Tourism's (MEFT) Department of Environmental Affairs and Forestry (DEAF) with sufficient information to make an informed decision on the granting of an ECC for the proposed activities.

OMAVI Geotechnical & Geo-environmental Consultants is a specialist environmental management consulting entity, with considerable experience in biophysical and socio-economic impact assessments, best practice environmental assessment and management reporting, Waste Management Planning, drafting of project-specific Environmental Management and Rehabilitation Plans (EMRPs), stakeholder engagement and participation coordination, and the management and co-ordination of all aspects of the Environmental Impact Assessment (EIA) process including the sourcing of competent specialists. OMAVI has been active in the above-mentioned fields, and in so doing has made a positive contribution towards the achievement of environmental management and sustainable development objectives in Namibia. The public consultation process was facilitated by a trained and experienced assessment practitioner who also compiled the ESA Report and EMP, and their CV is attached hereto in **Appendix A**.

## 1.6 The Environmental Scoping Assessment Process

The environmental scoping assessment process followed by Omavi for the current project is summarised below:

1. Project screening process.
2. Preparation of the Background Information Document (BID) and ECC Application and their submission to the Office of the Executive Director in the Ministry of Mines and Energy (MME) (Competent Authorities on the 18<sup>th</sup> of January 2023) for notification and recommendations. The date stamped copy of the ECC Application from the MME was uploaded to the MEFT's EIA online portal for registration (**Application APP - 00834**) and notification of the commencement of the ESA. The copy of the ECC application is attached as **Appendix B**.
3. Invitation to stakeholders (I&APs) and the public to participate in environmental scoping assessment process. This invitation was extended in the form of advertisements in local newspaper, notices on selected sites as well as via direct emails and registered mails to key authoritative institutions such as Line Ministries, Regional and Local Governments (authorities), farm/landowners or occupiers of land.
4. A site walk-over was undertaken 8<sup>th</sup> of March 2023 to understand the receiving environment.

5. Compilation of the Draft environmental scoping assessment (ESA) Report (consolidating all findings in terms of impacts identified as well as comments and concerns raised from the I&APs/public consultation), and a draft Environmental Management Plan (EMP) (which outlines impact mitigation measures).
6. Circulation of the Draft ESA Report (with all appendices) to the public (I&APs) for review and comments.
7. Finalization of the ESA and draft EMP and further inclusion of comments from the second round of engagements.
8. Submission of the final ESA report (and EMP including all appendices to the report) to the Department of Environmental Affairs and Forestry in fulfilment of all the requirements of the Environmental Impact Assessment (EIA) Regulations No. 30 of 2012 and the Environmental Management Act, (EMA), 2007, (Act No. 7 of 2007) for application of the Environmental Clearance Certificate (ECC) for the proposed project.

A summary of the process followed is provided in **Figure 1-4** below.

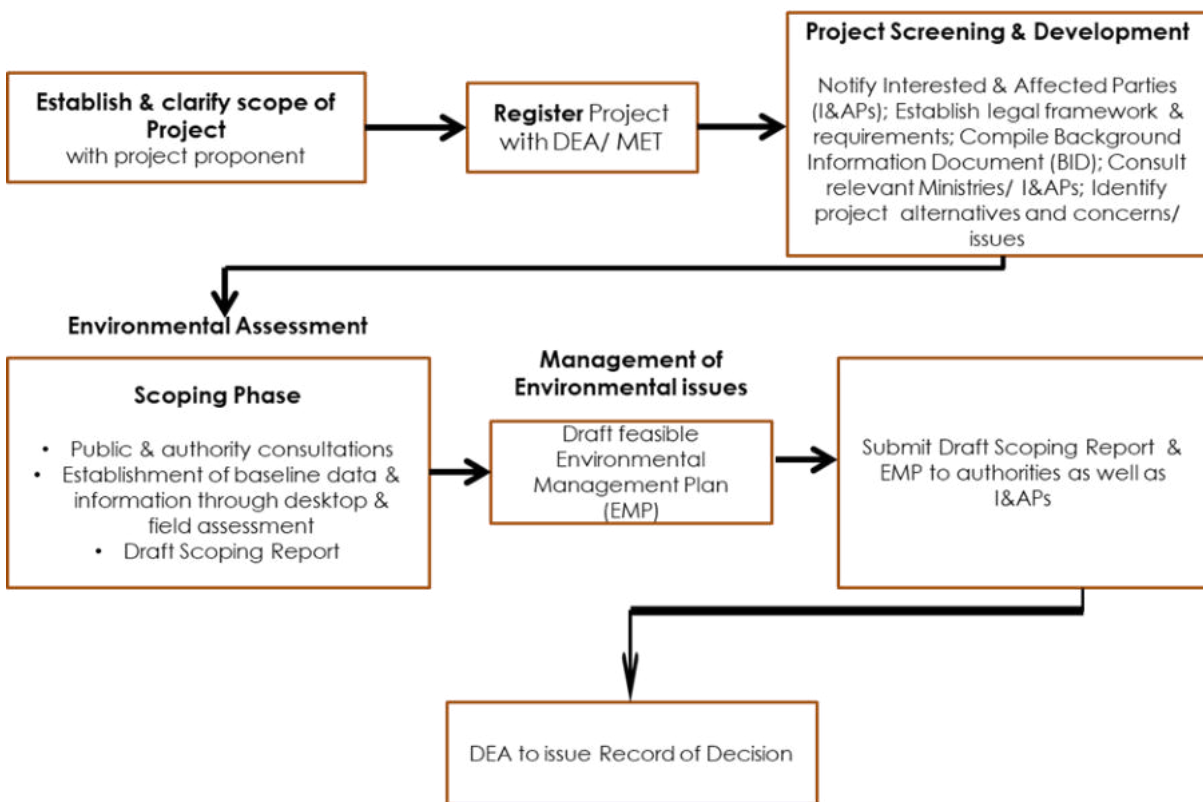


Figure 1-4: Schematic process flow of Namibia's

## 1.7 Limitations to the study

The following assumptions apply to this scoping assessment and its report (this document):

- This report has been compiled on a scoping level and no specialist studies were done as part of the assessment.

- The project specific information used in this document is as provided by the Proponent, site observations, OMAVI Consultants experience, relevant literature as well as personal communication with the landowners.
- OMAVI Consultants assumes that all the project technical information and data provided by the Proponent is correct and accurate, and that all necessary information has been disclosed.
- It is also assumed that the relevant information obtained from different literature consulted is accurate; and
- This environmental scoping assessment (ESA) report has been compiled on assumption that there will be no significant changes to the proposed project activities or to the affected biophysical and social environment between the time of compiling this report and implementation of the proposed project, that could substantially influence findings of this document. **New potential impacts that may arise during the project life cycle would need to be addressed as soon as they are identified, and mitigation measures thereof provided (hence the emphasis on monitoring in the Draft EMP – Appendix C of this document)**; and
- It is also assumed that there will be no significant changes to the project activities that could substantially influence the mitigation measures given and recommendations made for the management and protection of the host environment.

## **2 PROJECT DESCRIPTION**

The exploration works to be undertaken on EPL 8786 will focus on the search for Base and Rare Metals, Precious Metals, and Industrial Minerals with possible search for Dimension Stones. This section discusses the activities to be undertaken for the exploration of these metals as well as the required and associated infrastructure. **It must be noted that these proposed activities are only to be undertaken once the ECC has been granted by the Environmental Commissioner, and works will be carried out over the validity period of the licence, upon which all necessary permits will be renewed accordingly.**

### **2.1 Proposed Exploration Methods**

The exploration techniques to be applied can be classified as invasive or non-invasive depending on the impact they can have on the environment. Exploration works will be undertaken as per the following phases:

#### **2.1.1 Desktop Study**

The exploration program will commence with a review of existing geological information such as maps, historical drilling data given that the area has been explored and mined before. Remote sensing tools such as satellite imageries, geographic information systems (GIS) will be employed to visualize the geology of the area. This is a non-invasive technique.

### 2.1.2 Reconnaissance and mapping

At this stage, information from the desktop study will be confirmed during a field visit. Additionally, on the ground geological mapping will be undertaken to produce a geological map that indicates exposed rock units on the EPL as well as their properties (rock types, deformation features, structures, orientation of the units, mineralogy, etc.) and to also give an indication of where the soil cover is. During this mapping, hand size samples will be collected to verify the different units.

### 2.1.3 Geophysical Survey

This stage will be of great importance to generate target areas given that majority of the area is flat and underlying geology is concealed by Kalahari cover. Geophysical surveys will be conducted both by ground and airborne techniques. The techniques to be employed may include but not limited to electromagnetic (EM) survey, magnetic and magneto telluric (MT) methods, given the physical properties of the targeted metals or concealed units (blind orebodies). These techniques provide a contrast between potentially mineralized units and overburden, which makes it possible to detect economically significant mineral accumulations (Dentith and Mudge, 2014).

Ground geophysics entails the use of portable electronic equipment carried on foot by exploration staff within a target area (Figure 2-1 left), while the airborne geophysical technique seeks to measure electrical conductivity and magnetic variations of material using highly sophisticated measuring instruments suspended underneath a helicopter or light aircraft (Figure 2-1 right). The latter is advantageous over the former as it can measure variations up to 600m beneath surface and can cover a bigger area over a short period.



Figure 2-1: A demonstration of the two types of geophysical methods with ground-based magnetometer (left) and airborne magnetometer (right).



These techniques are also minimally invasive, as they either require fitting of electrodes into small holes in the ground and only linear traverses of electrodes will require clearing of cutlines. For the airborne geophysical surveys, necessary permits will be obtained from Namibia Civil Aviation Authority (NCAA).

#### **2.1.4 Geochemical sampling**

This will entail systematic sampling of soils, rock from the few outcrops in the area and stream sediments from rivers and streams, all for geochemical analyses. In the case of soils, the topmost cover will be removed so that sampling is done at depths of 10cm, into bags of approximately 100 grams. These holes will then be reinstated and the organic topmost layer is put back. All samples collected from the EPL will then be subjected to geochemical analysis in the laboratory, which will reveal their elemental concentration as well as mineral phases. At this stage, these concentrations will be presented on a geochemical map.



Figure 2-2: Examples of geochemical sampling of soils.

Thereafter, geophysical data will then be interpreted in combination with the geochemical and geological findings, in order to generate areas of interest that will then be targeted for further prospecting. Beyond this, techniques become complex and costly, therefore it is important to narrow down the EPL to target areas on which further exploration will focus. This will also help to reduce the overall footprint of exploration.

#### **2.1.5 Exploration drilling**

The areas of interest determined from the previous phases will be drilled, to further understand the subsurface. Diamond Drilling (DD) will be undertaken at the initial stages and will be done at a wide spacing. Reverse Circulation (RC) technique will then be used for infill drilling, at a much higher density or narrower spacing to allow extrapolations of the rock units.

Diamond drilling uses a diamond-studded drill bit attached to the end of a hollow drill rod and a core tube to cut through solid rock and recover solid core. In the process, water is injected into the drill pipe, for cooling and lubricating the drill bit as well as for washing out drill cuttings. Reverse circulation drilling on the other hand is uses compressed air down the annulus of the drill rod; and

the differential pressure creates air lift pushing water and cuttings up the inner tube that is inside each rod. The drill cuttings then travel up the inside of the drill rod and are collected in a sample bag on the surface.



Figure 2-3: Left – diamond drilling and right photo – RC drilling method.

The material recovered from RC drilling and core from DD will be logged to understand the geology and the nature of underlying rock units. This material will also be sampled and transported to a laboratory for geochemical testing. This information will be instrumental in the resource modelling and delineation of mining targets.

**Should this stage yield positive results, it means works will need to advance to mining, in which case a separate environmental assessment will be required to support the mining licence application. If no viable resource is found at exploration stage, works will proceed to rehabilitation and decommissioning phase discussed in Section 2.1.6 to reinstate disturbed sites.**

#### **2.1.6 Rehabilitation of Explored Sites and Decommissioning**

This stage is an attempt to ensure that the disturbed sites are reinstated and restored to a condition as close to the pre-exploration state as possible. The following measures should be consideration by the end of the exploration works:

- a) Removal of infrastructure and unused or unwanted equipment. No facilities or equipment should remain on site unless with the written approval of the landowner/occupier of land or relevant authority.
- b) Removal of rubbish for disposal at approved waste sites. Care is required with regards to residual toxic or hazardous materials including contaminated packaging and containers.

- c) Removal of all services, dismantling of campsites.
- d) Removal or burial of concrete slabs, footings (if any), etc.
- e) Backfilling of holes, and sampled areas, securely and permanently covering any boreholes, pits, or similar excavations.
- f) Restricting or preventing public access by removal or closure of access roads and tracks leading to high-risk explored areas until such a time that the area is clear of exploration activities induced 'risk or danger'.
- g) Functional water boreholes and solar panels can be donated to the local farmers.

It is anticipated that rehabilitation works will be marginal as most of the techniques to be employed in this exploration are minimally to non-invasive.

## **2.2 Project inputs and Associated Infrastructure**

### **2.2.1 Personnel and accommodation**

**Personnel:** The field-based support and logistical activities will depend on the scale of works to be undertaken. It is anticipated that an exploration team of about fifty (50) people, including skilled, semi-skilled and unskilled, personnel will be required. This will include, cooks, field geotechnicians, field and office geologists, drivers, drilling contractors, hydrogeologists, as well as general field assistants for sampling. This number could increase as the project evolves and based on the project findings. These changes will be communicated to all stakeholders including farmers, through the biannual reporting requirement for EPL. Priority for employment will be given to the locals and only specialized skills will be imported. Employment terms will hold throughout the life of the exploration project, whose works will be carried out over the validity period of the EPL.

**Safety:** All workers will be equipped with adequate and appropriate personal protective equipment (PPE), that will be replaced or repaired to ensure that workers' occupational health and safety is not compromised. A minimum of two first aid kits will be readily available on site to attend to potential minor injuries. For safety and security reasons, the localized high-risk working areas such as drilling sites will be demarcated, with restricted entry. Project vehicles will also be equipped with fire extinguishers as well as at the working sites in case of fire outbreaks.

**Temporary accommodation:** Once on the ground activities of the exploration program have commenced, mobile temporary structures will be set up to accommodate the team onsite. It will primarily be an erection of tented facilities or prefabricated structures, with an option to lease farm infrastructure. The facility will have showers, portable toilets, and a portable kitchen. Other temporary structures would be for office and storage space. All this will take place subject to approval by the farmers or landowners. **Therefore, the proponent and the landowners will need to have agreements in place prior to the commencement of the exploration project.**

### **2.2.2 Vehicles, Machinery and Equipment**

These will include 4 x 4 bakkies for use by the exploration team, Diamond Drill Hole (DDH) and Reverse Circulation (RC) drill rigs, excavator / front-end loader to scoop up sandy overburden or top soil, dozers to clear areas planned for drilling, accommodation as well as site access roads, a water tanker for use in drilling, portable geophysical equipment such as magnetometers and electromagnetic apparatus. Other added tools are for example two-way radios for communication, soil, rock and stream sediment sampling equipment (bags, sieves, spades etc.). All equipment, machinery and vehicles will be stored at a designated area near the temporary accommodation on site.

### **2.2.3 Power Requirements (for vehicles, machinery and domestic use)**

**For exploration:** A trailer mounted diesel tank of about 30 000 litres will be kept onsite once drilling has commenced, designed and constructed according to the South African Bureau of Standards (SABS). This fuel/diesel will mainly be used in powering the drill rigs. A diesel bowser truck will be filling the onsite tank, as and when required. Other vehicles will be refilled at the nearest towns (Gobabis).

**For domestic use:** will be sourced from photovoltaic solar panels provided by the proponent to provide light at night, power electronics including refrigerators. Gas cylinders will be used source of power for cooking and heating. In cases where firewood may also be used for this purpose, it will be provided by the proponent from an approved firewood supplier, so that no firewood is collected onsite or from nearby farms without landowners' or occupiers' permission.

### **2.2.4 Water supply**

Water demand for domestic use by the exploration team staying onsite will be about 2m<sup>3</sup> daily while amounts required at drilling stage for the actual drilling, cleaning and cooling off equipment, will be about 75m<sup>3</sup> daily. Three sources of water were considered for this project:

**Option 1:** to buy water from farmers in the area who already have good yielding local boreholes, or source it from existing local boreholes, subject to granting of permission by the farmers and undertaking by the proponent to duly compensate the farmers. This will also require amendment of existing abstraction permits (Groundwater Abstraction and Use Permit (GWAUP) by the Department of Water Affairs (DWA) at the Ministry of Agriculture, Water and Land Reform (MAWLR)) to cater for this change.

**Option 2:** The proponent to drill a new borehole on the EPL, which would require a comprehensive groundwater study of the area to be conducted upon granting of the ECC, to assess the groundwater potential and advise the siting of the borehole. The proponent will ensure that all necessary permitting (GWAUP) are obtained prior to the development and use of such borehole.

**Option 3:** Should the above options not be viable, consideration will be given to bringing water to site as a last resort. This water will be sourced from a private industrial premises in the nearby towns such as Gobabis, and transported by truck in a water bowser as and when required.

### **2.2.5 Roads**

The area with the EPL 8786 can be accessed via the B6 Trans Kalahari Highway to Witvlei, and onto D1663 gravel road. The EPL is also dissected by various farm roads that are well maintained and in good condition. Therefore, the project will utilize existing roads as far as possible, and temporary informal access routes will only be created to gain access to the actual targeted sites. The Proponent may need to upgrade some of the farm roads to ensure that they are fit to accommodate project vehicles, such as rig bearing trucks, and erect temporary road signs for the duration of the project.

### **2.2.6 Waste production and sanitation**

Domestic waste: Different waste containers will be provided onsite for waste sorting and safe disposal of waste generated onsite. These will be collected on a weekly basis and sent to nearest approved waste management facility in the area.

Exploration waste: Wastewater from drilling will be recycled where possible, and effluent will be contained and allowed to evaporate after use. The drill-sludge or mud will be disposed of at the nearest municipal waste disposal site.

Sanitation: Movable ablution facilities or mobile toilets with septic tanks will be put up for sanitation purposes for the exploration team and will be emptied in good time according to manufacturers' instructions.

## **2.3 Project Alternatives**

Project alternatives can be defined as a possible course of action, in place of another, that would meet the same purpose and need. The role of alternatives is to find the most effective way of meeting the need and purpose of the proposed project, either through enhancing the environmental benefits of the proposed activity, and/ or through reducing or avoiding potentially significant negative impacts. The concept of considering alternatives thus ensures that the environmental assessment is not reduced to the defense of a single project proposal that is the desire of the proponent, and therefore, provides an opportunity for unbiased considerations of options, to determine the most optimal course of action. The alternatives weighed and considered for this project are with regards to:

- Project location,
- Exploration methods (techniques),
- Supporting infrastructure during different stages of the project, and
- The "No-go" alternative option

### **2.3.1 Project location alternative**

The allocation of a mineral licence is determined by the mineral potential of the area, and by the preference of the applicant (individual or company). In this case the proponent is in search for Base and Rare Metals, Precious Metals, and Industrial Minerals and while these minerals are found elsewhere in Namibia; the pursuit of such resources is subject to licencing. Which means the

applicant may only prospect for desired minerals within the confines of his/her licence. For this reason, alternative localities of such minerals have not been considered. Information pertaining to EPL 8786 is available on the Namibia Mining Cadastral Map (<https://portals.landfolio.com/namibia/>).

### 2.3.2 Alternative drilling methods (techniques)

Drilling methods were chosen based on cost, the environment as well as accuracy in terms of required mineral information. Reverse circulation drilling and diamond drill hole were chosen for their accuracy in terms of understanding the material beneath the ground. Diamond drilling was chosen to be a preceding technique, to be done on a wider spacing, while RC drilling, which is cheaper and quicker, will be used to fill in the gaps.

### 2.3.3 Alternative supporting infrastructure

Alternatives were considered for the different envisaged supporting infrastructures, to ensure that the most feasible options were selected. Due consideration was given to technological, economic, and environmental limitations in selecting the most feasible option (Table 2-1).

Table 2-1: A summary of the alternative infrastructure considered for the project.

Category of Infrastructure	Alternatives Considered	Justification for selected option
Ablution facilities	Install fixed facility with septic tank	To avoid long-term visual impacts & minimize rehabilitation costs, portable facilities were selected as the best option.
	Portable facilities with septic tank	
Water supply	Use existing farm boreholes	The three options will be implemented in that order, and the proponent will go with which ever turns out to be more efficient, less costly and permitted by the landowners and relevant authorities.  A new borehole will be drilled, if no existing borehole can be used. If this option is not viable, water will be brought to site from elsewhere to replace or supplement the abstracted volumes.
	Drill own new borehole	
	Bring water from elsewhere	
Diesel storage	Install fixed above-ground diesel tank on site	The use of a trailer mounted diesel tank for fuel storage was chosen due to great mobility requirements during exploration.
	Trailer mounted diesel tank	
Power supply	Diesel generator set	Most practical & economically viable for exploration vehicles and machinery.
	Gas stove or Firewood	Fuel for domestic use will mainly be gas stove or firewood, which will be provided by the proponent from an approved firewood supplier, therefore no firewood will be collected onsite or from nearby farms without landowners' or occupiers' permission.

	Install photovoltaic panels	The solar panel option is likely to be considered for long-term operations if an economic deposit is found.
Offices space and accommodation	Erect dis-mountable prefabricated units	Favoured during field exploration phase due to: <ul style="list-style-type: none"> <li>- Ease of installation</li> <li>- Low installation costs</li> <li>- Ease of dismantling &amp; moving</li> </ul>
	Erect Permanent buildings	Least favoured & unlikely
	No office, accommodation structures on site	Option likely to be considered in future, should the project proceed to mining phase. Workers will be accommodated in nearby towns and settlements. This will minimize risk of veld fires, bush hunting, visual impact from such structures, security risk, & minimize number of people on site.

### 2.3.4 No-go alternative

The “No-Go” alternative is the option of not proceeding with the proposed activity, which typically implies a continuation of the status quo. Should the proposed project be discontinued, none of the potential impacts identified in **Chapter 6** will occur. On the other hand, if the project is to be discontinued, the potential economic benefits of the project will not come to fruition. These include:

- Loss of foreign direct investment
- Jobs for community members will not be realized
- Loss of potential income to local and national government through land lease fees, license fees and various tax structures
- Loss of support to local businesses through the procurement of consumable items such as Personal Protective Equipment (PPE), machinery spare parts, lubricants, etc.
- Socio-economic benefits such as skills acquisition to local community members in the Okarukambe Constituency.

Considering the above losses, the ‘no-go’ option was not considered a preferred alternative.

The project activities described above are governed by certain legislations, which should be complied with throughout the project life cycle. The applicable/relevant legislations, policies and guidelines are presented under the next chapter.

## 3 APPLICABLE REGULATORY FRAMEWORK (LEGAL REQUIREMENTS)

All mineral rights in Namibia are vested in the state and are regulated by the Ministry of Mines and Energy (MME), with the Minerals Prospecting and Mining Act (Act no. 33) of 1992 as the principal act governing exploration and mining of mineral resources in the Republic of Namibia. From an environmental management standpoint this Act stipulates the undertaking of an environmental impact assessment during prospecting or mining operations, coupled with the development of a thorough and implementable environmental plan (EMP) where any pollution is anticipated to

occur. The Ministry of Mines and Energy is the custodian agency for administering and enforcing the Minerals Prospecting and Mining Act.

Meanwhile, the Ministry of Environment, Forestry and Tourism (MEFT) regulates all “listed activities” under the Environmental Management Act (EMA) of 2007 and its Environmental Impact Assessment (EIA) Regulations of 2012. This role is specifically entrusted with the Department of Environmental Affairs (DEAF) within MEFT. This Act stipulates that possession of an Environmental Clearance Certificate (ECC) is a pre-requisite for issuing any license or permit by any authority for any activities related to the ones listed under the Environmental Impact Assessment Regulations of 2012. The Act further sets out, under Section 58 and in the Government Notice No. 29 of 2012, a detailed framework and schedule for conducting Environmental Impact Assessments for mineral exploration and mining related projects.

In addition to these two governing acts, there are a number of relevant local policies and guidelines which are presented in this chapter. These were considered when undertaking this ESA process, and they serve to inform the project Proponent, Interested and Affected Parties and the decision makers in both the Office of the Environmental Commissioner at the DEAF and the Competent Authority (i.e., the Ministry of Mines and Energy) of the requirements and expectations, as laid out in terms of these instruments, to be fulfilled for them to carry out the proposed exploration activities. The Table below summarizes legal aspects relevant to this project.



Table 3-1: A summary of legal requirements related to EPL 8786.

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	ASPECT OF PROJECT
<b>Relevant Acts</b>		
<p>Environmental Management Act No. 7 of 2007 and its 2012 EIA Regulations Government Notice 28-30 (Government Gazette 4878)</p>	<p>MEFT: DEAF</p>	<p>Part 2 of the Act sets out 12 principles of environmental management, summarized as follows:</p> <p>The Proponent has the responsibility to ensure that the proposed impact management measures are implemented, conform to the principles of this Act. In developing this report, OMAVI has been cognizant of these requirements, and accordingly the process that was adopted has been undertaken in conformance with this Act and the EIA Regulations (2012). Several listed activities in terms of the Act, are triggered by the proposed activities as set out above.</p>
<p>Mineral Prospecting &amp; Mining Act (Act no. 33 of 1992)</p>	<p>MME</p>	<p>Sections 50, 52, 54, 57 and 130 of this Act sets out provisions for environmental management for activities arising from mineral exploration, quarrying/ mining and beneficiation</p> <p>OMAVI has considered the provisions made under this sections of the ACT in undertaking this Environmental Assessment.</p>
<p>Charter for Sustainable and Broad-Based Economic and Social Transformation in the Namibian Mining Sector 2014 – 2020 (The Namibian Mining charter)</p>	<p>The Namibian Chamber of Mines of Namibia</p>	<p>This charter aims to facilitate meaningful participation of historically deprived Namibians in the mineral exploration, mining and mineral beneficiation industry. It has effectively been developed as an instrument to effect transformation and sets specific targets for mineral license holders and Operators of mineral processing facilities active in Namibia. This has relevance to this project as the license Holder is a previously disadvantaged individual and will undertake the proposed activities jointly with their partners</p>
<p>The Minerals Policy of Namibia, 2003</p>	<p>Ministry of Mines and Energy: Mining Directorate</p>	<p>This policy sets out guiding principles and directions while communicating the values of the Namibian people in pursuit of the development of the mining and mineral resources beneficiation sector.</p>
<p>Pollution Control &amp; Waste Management Bill</p>	<p>MEFT and others</p>	<p>This Bill serves to regulate and prevent the discharge of pollutants to air and water as well as providing for general waste management. The Bill repeals the Atmospheric Pollution Prevention Ordinance (11 of 1976). In terms of water pollution, it will be illegal to discharge of, or dispose of, pollutants into any watercourse without a Water Pollution Licence (apart from certain accepted</p>

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	ASPECT OF PROJECT
<b>Relevant Acts</b>		
		<p>discharges). Similarly, an Air Quality Licence will be required for any pollution discharged to air above a certain threshold. The Bill also provides for noise, dust or odour control that may be considered a nuisance. The Bill advocates for duty of care with respect to waste management affecting humans and the environment and calls for a waste management licence for any activity relating to waste or hazardous waste management.</p> <p>The proposed prospecting activities would not entail the discharge of large quantities of gaseous pollutants into air but may result in increased noise levels, dust generation, destruction of in situ soil structure during such operations.</p>
Water Act (No. 54 of 1956)	MAWLR: Department of Water Affairs	<p>Makes provision for several functions pertaining to the management, control and use of water resources, water supply and the protection of water resources.</p> <p><b>The Proponent shall prevent any potential pollution of groundwater and surface water.</b></p>
Water Resources Management Act (Act No. 11 of 2013)		<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 resources. Should the proponent wish to undertake activities involving water abstraction and/or effluent (e.g., drilling fluids) discharge, the relevant permits will have to be applied for from the Department of Water Affairs.</p> <p>Furthermore, any watercourse on/or within the license area and surroundings, including associated ecosystems, should be protected in alignment with the principles above.</p>
Petroleum Products and Energy Act (No. 13 of 1990) Regulations (2001)	MME: Petroleum Affairs Division	<p>Regulation 3(2)(b) states that "No person shall possess or store any fuel except under authority of a licence or a certificate, excluding a person who possesses or stores such fuel in a quantity of 600 litres or less in any container kept at a place outside a local authority area.</p>

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	ASPECT OF PROJECT
<b>Relevant Acts</b>		
		<p><b>This law is applicable to this project because new diesel in excess of 600L will be stored on the site in a self-contained diesel storage tank to support all mobile plant such as drill rigs and trucks.</b></p>
National Heritage Act (Act No. 27 of 2004)	MEAC	<p>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 such as might be required in the event of damage to a protected site occurring as an inevitable result of development. Part VI Section 55 Paragraphs 3 and 4 require that any person who discovers an archaeological site should notify the National Heritage Council. Section 51 (3) sets out the requirements for impact assessment.</p> <p>Should any objects of heritage/ archaeological significance be identified during project activities, the work must cease immediately in the affected sites and the necessary steps taken to seek authorization from the Council.</p>
Public Health Act (Act No. 36 of 1919)	MoHSS: Occupational Health	<p>The Act serves 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 must ensure that all operations are operated in a way that is safe and healthy to both the employees and the public. Noise and dust emissions which could be considered a nuisance and/ or a health risk ought to be kept to acceptable levels.</p>
Labour Act, 2007	MLIEC	Sections 3, 4, 5, 11, 16, 23-27, 44 and 135 are relevant to this project and therefore the project proponent is expected to comply with provisions in the Labour Act of 2007

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	ASPECT OF PROJECT
<b>Relevant Acts</b>		
<b>Relevant Guidelines, Policies and Regulations</b>		
<p>Mine Health &amp; Safety Regulations (under section 138A of the Mining Act, 1992)</p>	<p>MME: Mine Safety &amp; Services Division</p> <p>MoHSS: Occupational Health Division</p>	<p>These set of regulations are aimed at ensuring that mineral prospecting projects as well as operational mines are operated in a safe manner to prevent and/ or minimize injuries, lost time, fatalities, or long-term health hazards. This has relevance to this project.</p>
<p>National Solid Waste Management Strategy of Namibia</p>	<p>MEFT and Local Municipalities</p>	<p>The Vision of this Strategy is for Namibia to become the leading country in Africa in terms of standards of solid waste management by 2028.</p> <p>The <b>Specific Objectives</b> of the Strategy are:</p> <ol style="list-style-type: none"> <li>1. To strengthen the institutional, organisational and legal framework for solid waste management, including capacity development.</li> <li>2. To install a widespread culture of waste minimisation and to expand recycling systems.</li> <li>3. To implement formalised solid waste collection and management systems in all populated areas, including under the administration of Regional Councils.</li> <li>4. To enforce improvements in municipal waste disposal standards.</li> <li>5. To plan and implement feasible options for hazardous waste management including healthcare waste management</li> </ol> <p>It is envisaged that a significant amount of solid waste will be produced in the form of litter, sewage, disposable samples bags, soil/ sediment samples, waste food, etc.</p>

## **4 THE RECEIVING ENVIRONMENT**

An understanding of the receiving environment provides a baseline in terms of current socio-economic and biophysical environments, so that changes that occur as a result of the proposed exploration works can be measured. This chapter discusses the receiving environment from literature, existing online datasets, previous reports of work done in the area, as well as from the ground assessment by the environmental practitioner during site visits undertaken on the 8<sup>th</sup> of March 2023. Additional information was obtained through verbal communication with the caretakers and landowners.

### **4.1 Climatic Conditions**

The EPL 8786 is located in the Omaheke Region about 20km north east of Witvlei, which is the closest settlement with a weather station. For this reason, meteorological information for the project area was deduced from the Witvlei weather station. The EPL 8786 is located in a part of Namibia which has a semi-arid climate and receives between 300 - 400 mm rainfall per annum with a variation coefficient of 40 - 50%. Rainfall events are limited to the summer months, mainly between November and April, in the form of sudden thunderstorms often associated with heavy downpours. The number of rainy days per annum (>1mm) is 45 – 50. Witvlei presents average temperatures that range between 11°C and 29°C, with December being the hottest month (average daily high temperature of 30°C - 33°C), while July is the coldest month (average minimum temperatures range between 2°C and 4°C).

As a result, the potential evaporation can reach 1,960mm per year, which provides a water deficit of about 1,900 mm per year. Relative humidity is low, rarely exceeding 20% in winter but may reach 80% in summer. In terms of wind regime, the predominant wind is from the north, north northeast, north northwest, usually with an average wind speed of 4.3 mph (6.9 kilometres per hour), and a calm of 20.1%.

The climate information for the area is shown in **Figure 4-1**.

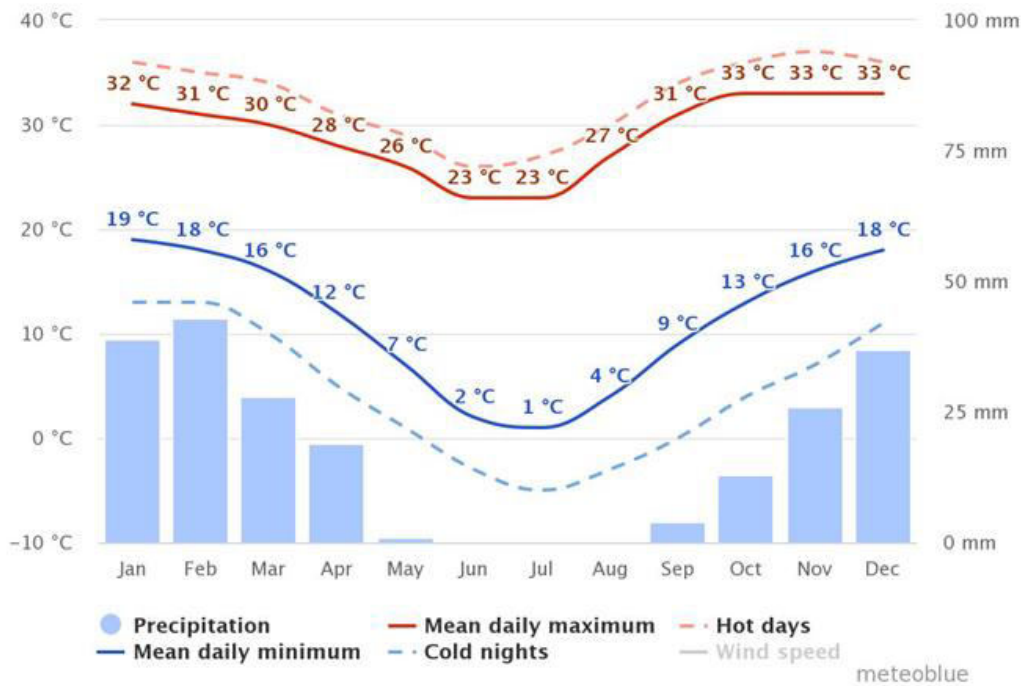


Figure 4-1: Modelled historical climate & weather data for Witvlei. (<https://www.meteoblue.com/> Retrieved: 10-02-2023).

## 4.2 Geology and mining history of the area

The central Namib area generally lies within the south-westerly - north-easterly trending intra-continental arm of the Pan-African Damara Orogen, which based on stratigraphy, structure and metamorphic grade, has been subdivided into a number of distinct zones (Miller, 1983). The EPL 8786 falls within the Southern Margin Zone (SMZ) and partly covers the Southern Foreland (SF). These zones form part of the old Kalahari Craton, which collided with and was subducted beneath the Congo Craton towards the northwest during the Damara Orogeny.

The oldest rocks within the area, which occur in scattered outcrops within the Southern Margin Zone of the Damara Orogen and the adjoining Rehoboth – Sinclair magmatic arc belong to the Palaeo to Mesoproterozoic Hohewarte Complex and the Marienhof Formation of the Palaeoproterozoic Rehoboth Group. The SMZ and SF are set apart by different rocks due to different grades of metamorphism, with thrust tectonics and low T / high P metamorphism experienced in the SMZ, contrasted by gentle deformation within the SF. Therefore, the siliclastic Nosib Group overlying the basement is overlain by mixed siliclastic / carbonatic Hakos Group in the SMZ, while the Witvlei Group are restricted to the SF.

Sedimentary rocks belonging to the Karoo Supergroup are also found in the area, outcropping along the northern edge of Aranos Basin and the Black Nossob River. They are covered by Neogene to recent sediments of the Kalahari Group, including wind-



blown sand, vegetated sand dunes, calcrete and gravels, which form the youngest unit within the map area.

On a more local scale, the EPL 8786 is largely dominated by surficial deposits of unconsolidated Quaternary sediments of the Kalahari Group (**Figure 4-2**), comprising of Eutric Regosols which are medium or fined textured soils of actively eroding landscapes, the thin layers lying directly above the rock surfaces from which they formed.



Figure 4-2: Soils of the Kalahari Group including windblown sands and calcrete.

Alluvial soils also occur, usually confined to minor streams and rivers in the area such as the Black Nossob. The central parts of the EPL has isolated outcrops of quartzites, cupriferous shales and conglomerates of the Eskadron Formation, a Mesoproterozoic to early Neoproterozoic part of the Tsumis Group (Error! Reference source not found.). Other rock occurrences include schists, phylites and quartzites of the Duruchaus Formation, and minor occurrences of the Marienshof volcanics and marbles.

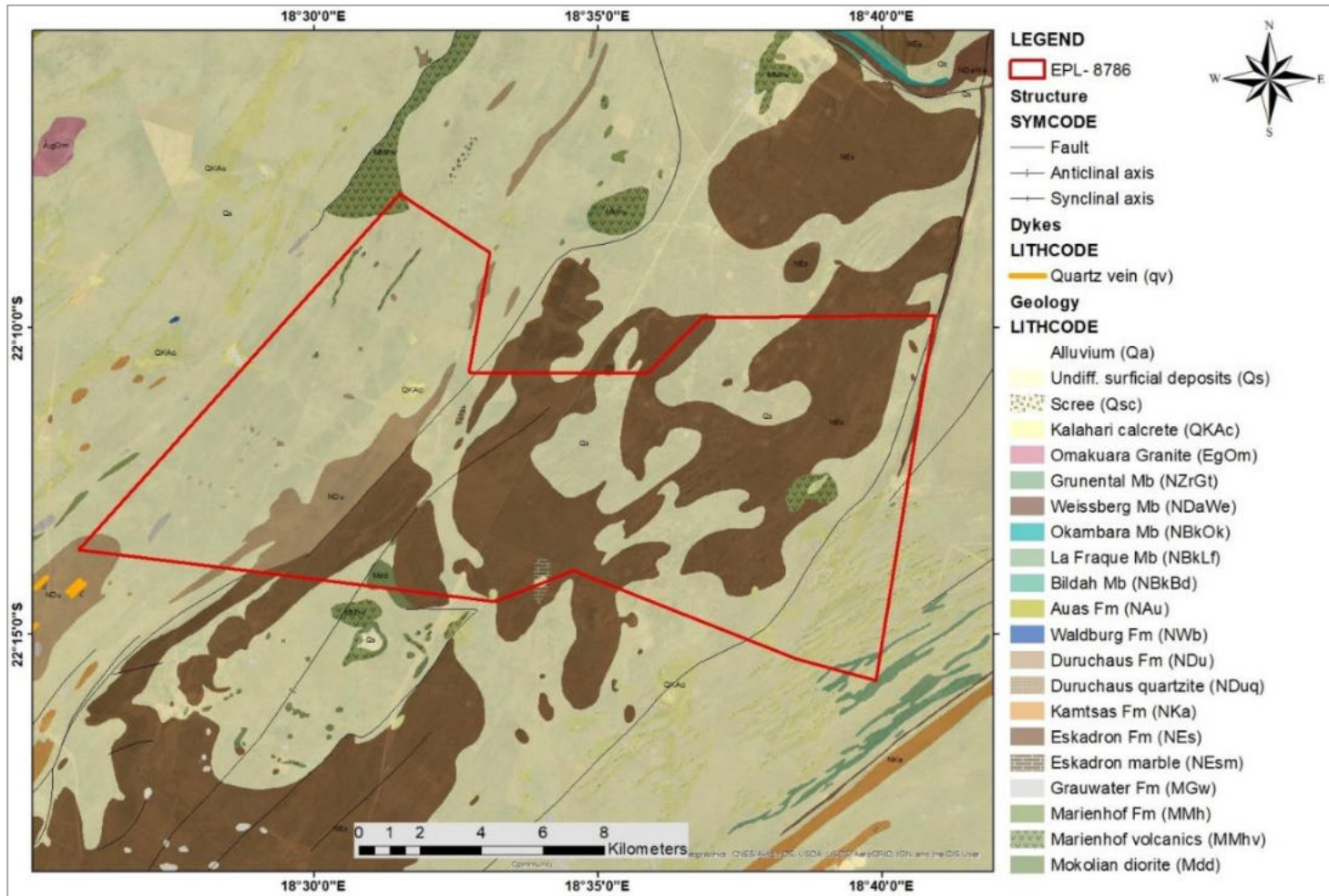


Figure 4-3: The geology of the EPL 8786 and surrounding.



In terms of previous mining and economic geology, the EPL falls within an area known to be an extension the "Kalahari Copper Belt", which extends from the Klein Aub area in a north-easterly direction into Botswana. The Kalahari Copper Belt hosts significant stratabound copper-silver deposits, including known ones such as Klein Aub, Oamites, Dordabis, Witvlei in Namibia (Anhaeusser and Button, 1973; Borg, 1987) and the ones along the Ghazi-Chobe belt on the Botswana side (Borg, 1987; Borg and Maiden, 1989). These are thought to share similarities with the central Africa Copperbelt of Zambia and the Democratic Republic of Congo (Borg, 1987).

The meta-sedimentary rocks of the Eskadron Formation which are found on the EPL are common along this belt and are known to comprise cupriferous and pinkish limestone that are overlain by several thousand metres of red quartzite. Additionally, the pelitic rocks of the Duruchaus Formation are also known have high-grades of base metals, distinctly in the schistose imbricated accretionary prism of the SMZ. This could be accredited to the several phases of deformation and metamorphism that happened during the subduction of the Kalahari Craton, Hakos Zone, and the Southern Foreland, resulting in folding, fracturing, and thrusting (De Thierry, 1987), hence the concentration of metals. Traces of copper mineralisation also occur in metapelites and carbonate layers in the Duruchaus Formation and in quartz-carbonate veins derived therefrom. Due to weathering, primary chalcopyrite and chalcocite have been altered to malachite, covellite and chrysocolla. The Geological Survey of Namibia has records of past mining works undertaken in the area at the Witvlei Pos, just south of the EPL.

### **4.3 Topography and Drainage of the area**

EPL 8786 area is in a generally flat terrain, with occasional NE-SW trending ridges whose average altitudes reach 1550 meters above sea level (amsl) on the eastern fringe of the Khomas Hochland. Altitudes are low in the Kalahari sandveld in the east, with variations in the rugged and dissected landscape, with the highest elevation of 1798m at the Groot Kleeberg, west of Witvlei. The surface water flow or hydrology of the area is governed by the topography and terrain, therefore, the main surface water in the area either flows to the Swakop River on the western side of the highlands and then on the eastern side it is carried by the White and Black Nossob Rivers. The area has two main ephemeral rivers which only flow during heavy rainy seasons, namely; the White Nossob River found to the west of the EPL and the Black Nossob River just northeast of the EPL (**Figure 4-4**), which both drain to the southeasterly to easterly direction. The Black Nossob confluent with the White Nossob to its west to form the Nossob River, which eventually flows to Botswana and South Africa after it leaves Namibia.

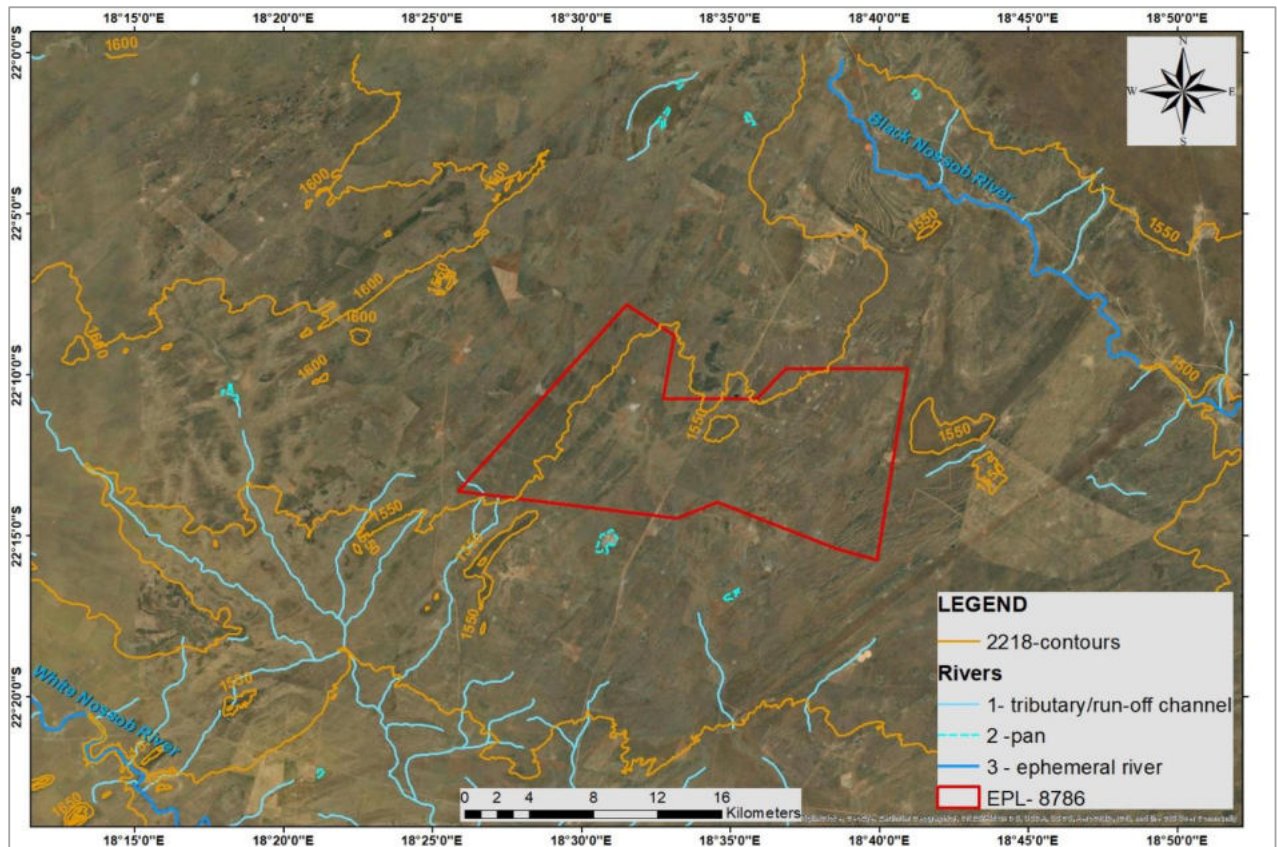


Figure 4-4: The relative to topography and hydrology or surface drainage of the area around EPL 8786.

#### 4.4 Groundwater Resources

The EPL is within the groundwater basin of the Hochfeld-Dordabis-Gobabis, which according to Christelis and Struckmeier (2001) stretches from east of Windhoek to the eastern border of Namibia. It mainly includes the sandveld between the Kalahari basins of northern Omaheke-Epukiro area and the Stampriet Artesian Basin. Most of the groundwater basin is underlain by either schist or sandstone/quartzite, which have inherently different water-bearing characteristics. Generally, groundwater in these fractured aquifers is hosted in faults and other secondary structures, more prevalent in competent rocks like sandstone and quartzite. Primary aquifers are also present in the area, in places where the porous aquifers occur in the Kalahari sediments.

The groundwater recharge in the area is by means of direct rainfall infiltration through the thin cover of the Kalahari sediments into the fractures, joints, and faults, as well as other secondary structures within the metamorphic and metasedimentary bedrock. There is also deep inflow of groundwater, which is seasonally recharged seasonally during flooding of the Black Nossob.

According to the groundwater potential map of Namibia by Christelis and Struckmeier (2001) the groundwater potential of the area is generally low but locally moderate for fractured, fissured and karstified aquifers units in the ephemeral Seeis, White Nossob and Black Nossob. The main rock types of hydrogeological units are non-porous sandstone, conglomerate and

quartzite (Error! Reference source not found.). Potential in porous aquifers is moderate. The water supply scheme for the village of Witvlei draws water from the fractured limestone of the Kamtsas formation along the White Nossob River.

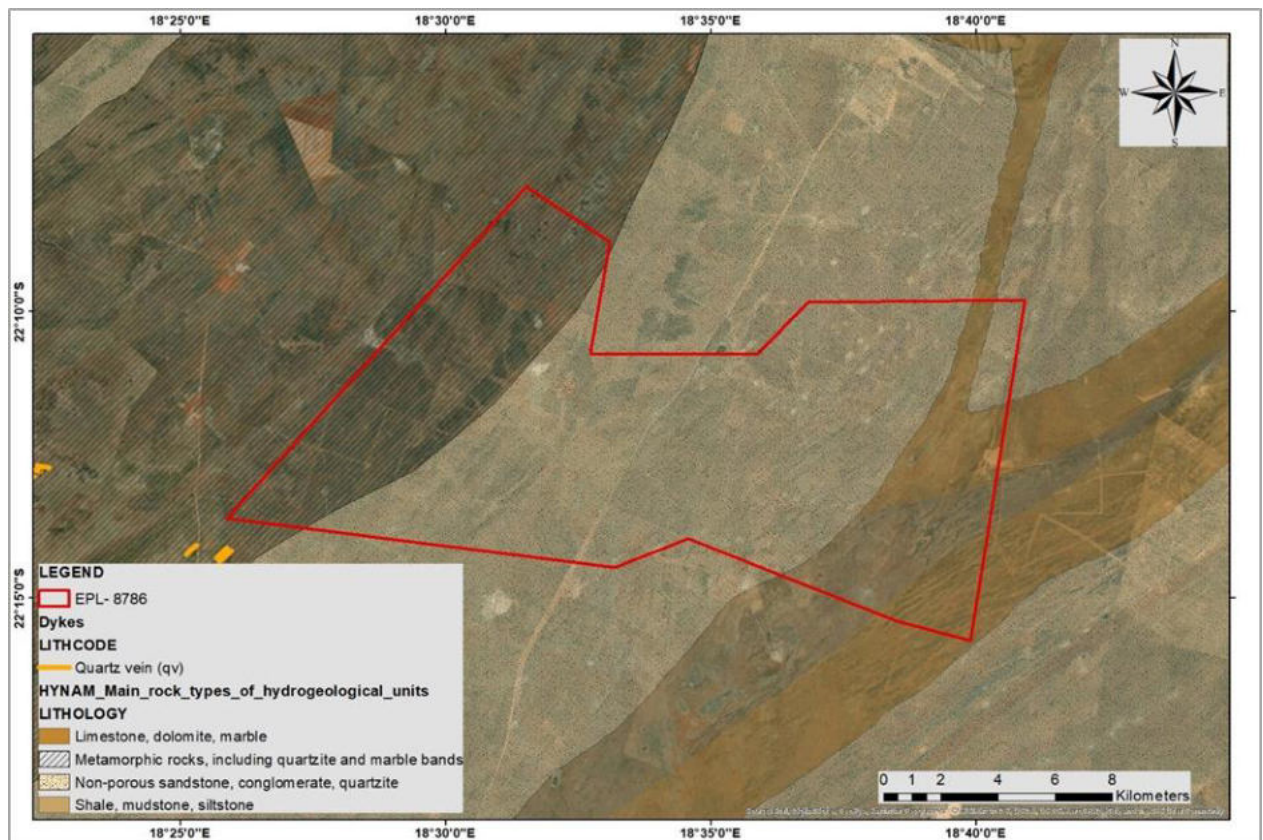


Figure 4-5: The EPL 8786 and the groundwater basins in which it is found.

In terms of ground water vulnerability, it can be seen from **Figure 4-6** that the potential for pollution is moderate. This could be attributed to the non-porous nature of the underlying rocks, which has restricted ability to transmit pollutants to the groundwater through fracture zones.





Figure 4-6: Groundwater vulnerability of the area around EPL 8786.

## 4.5 Biodiversity Baseline Information

Biodiversity refers to the relative abundance of the different types of life forms in an area. It is influenced by climatic factors such as precipitation and temperature as well as substrate / soil and topography.

### 4.5.1 Vegetation

According to the biome characterization by (Geiss, 1971), the project site falls within the Camel Thorn Savanna Biome. Mendelsohn et al. (2002) noted that where the soils are shallower and the landscape hillier, plant growth tends to be shrubby, while in areas where the soils become deeper and the landscape flattens, vegetation is characterized by large, open expanses of grass dotted by trees and bushes.

The area is dominated by different species of the Acacia, including the Camelthorn (*Acacia erioloba*) which is a protected specie, as well as the Black thorn (*Acacia mellifera*) and Red umbrella thorn (*Acacia reficiens*), which are classified as encroacher bushes. It was observed that local farmers harvest the invader bushes for the production of charcoal. Most of the woody vegetation vary between 1 and 5m in height. The dominant perennial grasses in the biome are *stipagrostis uniplumis* and *Eragrostis rigidior* which can be found in areas where the soil is sandier animals and domestic animals feed on.

Plant diversity in the area is estimated to be 400 - 499 species (Mendelsohn et al, 2002), although there may be local differentiation as a result of topography and the availability of water is possible.



Figure 4-7: Some Acacia plants observed onsite and grasses found on flatter terrains.

#### **4.5.2 Fauna**

In terms of fauna, the determinants of diversity include favourable habitats and breeding sites, migratory routes as well as availability of food and water or grazing sites to wild animals. The EPL lies within commercial farms, where game ranging is common, sometimes practiced together with domestic farming. For this reason, most wild animals are within privately owned farms as opposed to freely roaming. Although no animals were observed during the site visit, the presence of animals in the area is acknowledged as per literature. It must also be noted that the general endemism trends for Namibia show a clear decline to the east, therefore it can be expected that the number of endemic fauna species possibly present on EPL 8786 is low.

##### **4.5.2.1 Mammals**

There is a high diversity of mammal species areas with large mammals that are conspicuous and quickly recognized by lay people - herbivores such as great kudu (*Tragelaphus strepsiceros*), giraffes (*Giraffa camelopardalis*), wildebeests (*Connochaetes taurinus/gnou*), steenboks, warthogs, elands (*Tragelaphus oryx*) and baboons and large carnivores such as leopards, jackals and foxes.

##### **4.5.2.2 Reptiles and Amphibians**

The area is also associated a high number of reptiles such as Mole snake (*Pseudaspis cono*), Black mamba (*Python natalensis*) Southern african python, Bushveld lizard (*Heliobolus lugubris*), Namaqua sand lizard (*Pedioplanis namaquensis*) and Puff adder (*Bitis orietons*) (Environmental Compliance Consultancy, 2020).

#### **4.5.2.3 Birds: avifauna**

Birds species that are common to the area include the Black backed vulture, rosy-faced lovebird (*Agapornis roseicollis*) which is known to be endemic to the area, red necked falcon (*Falco chicquero*), Little swift (*Apus coffer*), Namaqua dove (*Oena Namaqua*), and guinea fowls (*Numida meleagris*), eagle species – (*Aquila rapax*, *Aquila spilogaster*) and Shaft-tailed whydah (*Vidua regio*).

## **4.6 The socio-economic environment**

### **4.6.1 Socio-economic Profile and current land uses**

The proposed project area is located in the Omaheke Region, in Okarukambe Constituency. The nearest settlement is Witvlei Village, which according to the 2011 national census of Namibia, had a population of about 1, 768 people and a population density of 22.31 per km<sup>2</sup>. Witvlei is a place of historical significance as it was the battle ground of the first Herero-Nama War. Omaheke Region has a mixed population of early inhabitants and late settlers, which resulted in diverse languages with Otjiherero being the dominant language, while others such as Afrikaans, German, Damara/Nama, Setswana and Oshiwambo are also widely spoken. Economically active population in Omaheke is estimated at 65 percent, 42.3 percent of which is unemployed. The employed ones are usually absorbed by the activities commonly practiced in the region, which are discussed below.

**Farming:** The type of farming commonly practiced in the region is large stock (cattle farming) and to a lesser extent small stock farming (goats and sheep). The region is one of the biggest contributors to Namibia's livestock production and to the total agricultural output, because it has some of the best grazing areas in Namibia, and it is for this reason that it is sometimes referred to as the "cattle country" (Werner and Odendaal 2010: 54).

**Transport and logistics:** Omaheke Region borders Botswana in the east therefore, it hosts one of the entry points between Namibia and Botswana, which makes it a lucrative business hub for exports and imports to the landlocked country (the Kalahari corridor). The presence of an airstrip in Witvlei also contributes to transport services.

**Tourism and conservation:** The region is ideal for game ranching as it has vast open savannas. For that reason, the establishment of many tourism safaris and the development of a multitude of game farms is common in the area, all of which greatly contribute to the country's tourism industry. Furthermore, Omaheke serves as one of the hunting areas of the country, and every year between June and August hunters flock to the region (Omaheke Region development profile, 2015).

**Charcoal production:** Most farmers practice charcoal production as a measure for combating bush-encroachment, as the invader bush normally takes over the game browsing and cattle grazing areas. This has proven to be a good source of income for most farmers.

**Mining:** Although not commonly practiced in the region, there are known historical mineral prospecting and mineral occurrences in the Witvlei area which form a segment of the Kalahari Copper Belt, that according to literature is comparable to the Zambian Copper Belt. The Witvlei area comprises of multiple areas namely Gemsbokvlei, Christiadore, Okasewa NW, Witvlei pos, Malachite and Daheim. There are also historic reports of past airborne magnetic surveys and exploration drilling available at the Geological Survey of Namibia.

#### **4.6.2 Existing infrastructure**

**Transport infrastructure:** The project site (EPL 8786) can be accessed via the B6 highway from Windhoek, connecting to the D1663 district gravel roads that turns off before entering Witvlei. There are also good farm roads that give access to the site, however should new access routes be required, necessary agreements will be entered with the landowners.

**Power infrastructure:** The national power power lines run just parallel to the main road and some power lines transverse the project site. However, solar installations were commonly observed in the area for most farmhouses with only a few connected to the main power grid. For powering boreholes common power sources include solar, wind and diesel. **Domestic activities pertaining to the current exploration project will be supported by solar power and gas, while the actual exploration activities such as drilling will use hydrocarbons (i.e. diesel) to power the machinery.**

**Water:** The water supply scheme for the village of Witvlei draws water from the fractured limestones along the White Nossob River. Majority of the farmers have privately owned boreholes (operated either on solar, windmill, diesel engine or hand pump)). They also created earth dams on their farms. **For the proposed exploration, the first option for sourcing water is to buy from nearby farmers with good yielding boreholes and if this does not materialise, the proponent will site and drill a borehole, with necessary permissions from landowners and regulatory bodies. The third option would be to buy water from industrial operators.**

**Health, Educational Facilities and others:** the Witvlei settlement has a clinic, small shops and several schools. Other nearest health facilities and schools are the neighbouring major towns of Windhoek and Gobabis. The settlement also had the Witvlei Meat Facility an abattoir which was established in 2006 and closed in 2016.

#### **4.6.3 Air quality and noise levels**

The overall quality of air of the area is influenced by prevalent activities as well as its climatic conditions. Generally, the air quality in the area is affected by fugitive dust emitted by day to day use of gravel roads by the locals, coupled with gaseous and particulate emissions contributed by vehicles. Additionally, the production of charcoal in the area contributes to gaseous emissions. Similarly, these activities also contribute to noise levels in the area. Potential receptors of noise include the animals, residents and tourists that frequent the area due to various attractions in the surrounding.

#### **4.6.4 Archaeology and Heritage Resources**

This subject has been excluded from this assessment as desktop review of the general EPL area did not revealed any site of heritage or archaeological importance. This was also supported by the consultation of requirements for the proposed activities upon registration of the project with MEFT. However, care must be taken when working in drainage lines, as these were previously used as walkways by early inhabitants. The EMP also outlines reporting procedures that must be followed in the unlikely event of a possible chance find, to ensure compliance with the National Heritage Act (Act No. 27 of 2004).

## **5 PUBLIC CONSULTATION PROCESS**

The Public Consultation process aims to ensure that all persons or organizations who may be affected or interested in the project are kept informed of potential issues/ concerns and benefits, and can register their views and concerns with the Environmental Assessment Practitioner (EAP) so that they are considered and addressed in the Environmental Impact Assessment process and all related documentations. Building from there, the process provides such stakeholders with an opportunity to influence the project's designs, programs and operational strategy so that its benefits can be maximized, and potential negative impacts minimized.

The current best practice model for public participation is to engage in a process of continuous dialogue with the affected community and other stakeholders as plans for the project evolve and the environmental assessment is advanced. A high level of interaction is maintained, potential and actual socio-economic plus environmental impacts are identified, and stakeholder needs and concerns are discussed and wherever possible built into the planned activities of the project, including decision-making and management practices. Good and transparent consultation with stakeholders helps foster genuine and positive relationships with mutual respect, shared concerns and objectives between the company pursuing or involved in the development and the affected community.

The role of the EAP in the public participation process is to coordinate that process of dialogue to ensure there is transparency and public confidence in how the proposed activities will be undertaken as well as in the management of such activities.



## 5.1 Registered Interested and Affected Parties (I&APs)

During the scoping process, a preliminary list of the obvious and potential I&APs was drawn up. As the public participation process evolved, this list was continuously updated. A complete summary of the I&APs identified and registered for the project can be found in **Appendix D**. The pre-identified I&APs were notified about the project's activities by email, advertisement in local newspapers, electronic mail, and display of written notices at strategic locations within Witvlei and Gobabis, as well as within/ near the EPL.

Amongst key stakeholders identified and registered for this project were:

- **Central or national government:** Ministry of Environment, Forestry & Tourism; Ministry of Mines & Energy; Ministry of Agriculture, Water & Land Reform; Ministry of Urban & Rural Development; Ministry of Industrialisation and Trade; National Heritage Council of Namibia (under the Ministry of Education, Arts & Culture)
- **Regional government:** Omaheke Regional Council including the Okarukambe Constituency Councils.
- **Local authorities and Parastatals:** Municipality of Gobabis, Witvlei settlement office, Roads Authority, Local Authorities of Namibia, Nampower/ Cenored, Namwater, National Heritage Council, Namibia Chamber of Mines, National Botanical Research Institute, NCCI
- **Members of the public including directly affected farmers:**  
Refer to the stakeholders' list in **Appendix D**

## 5.2 First Round of Public Consultation: Summary of Activities Undertaken

To ensure that the I&APs were timeously informed of the proposed project's activities, the following tasks were undertaken:

- A preliminary list of pre-identified I&APs was compiled based on the EAP's knowledge of parties who are deemed relevant to the project.
- A notification email was circulated to all identified and registered I&APs on 20<sup>th</sup> January 2023 announcing the commencement of the EIA process and an invitation to the public to register as I&AP for the project as well as to provide any inputs on concerns or suggestions they may have regarding the proposed exploration program. Included in this email was the Background Information Document (BID) which provided a description of the project's scope of planned activities for the ECC application. A copy of this email trail is attached in **Appendix E**.
- Formal public notices announcing the commencement of the Environmental Assessment process and extending a formal invitation to the general public to register as I&APs were placed in *Die Republikein*, *The Sun Newspaper* and *Allgemeine Zeitung* newspapers (dated 20<sup>th</sup> and 26<sup>th</sup> January 2023, please refer to **Appendix F**).
- Printed formal written site notices were placed at various publicly accessible locations as outlined below. These were aimed to raise awareness amongst the general public of the ongoing EIA process for this project.
- Distribution of the BID and comments register form to directly affected farmers via registered mail. These are included in proof of communication in **Appendix E**.
- In addition, provision was made for the BID to be distributed on request to any I&APs during the public participation period which ran until 20<sup>th</sup> February 2023.

All the above was done to inform key organs of state and the general public about the scope of activities for this project and invite these key personnel to provide their inputs on the project in writing. Unfortunately, despite all the above being implemented no inputs (concerns or suggestions) were received from interested and affected parties regarding this project.

### 5.2.1 Public site notices

Official written public site notices/posters informing the public and the affected communities about the project as well as notifying them on how they can participate in the project and remain informed about the proposed activities. Site notices on the project were placed at the following strategic public locations as shown in. Some of these notices are shown in **Figure 5-1** and the rest are included in **Appendix G**.

- Public notice board at the Omaheke Regional Council headquarter offices, Gobabis
- Public notice board at Okarukambe Constituency office
- Public notice board at Nampost office, Gobabis
- Public notice board at Municipality of Gobabis's headquarter offices
- Public notice board at Witvlei settlement offices
- Public notice board at Witvlei Nampost offices
- Public notice board at Witvlei public clinic
- Within the EPL area, along the D1663 gravel road which cuts through the license area

Collectively, these notice boards were meant to help raise public awareness about the project.

### 5.2.2 Public consultation feedback: Key issues and concerns raised

Overall, no objections were raised or received from the I&APs in relation to the concerned project during the various consultations/ engagements, however, input was provided by the Namibian Agricultural Union as outlined in **Table 5-1**.

Table 5-1: Key issues raised during public participation process.

CATEGORY OF ISSUE RAISED	ISSUE(S) RAISED & BY WHO	RESPONSE
Impacts from Nuclear fuel minerals	Mrs. Tanja Dahl of the Namibian Agricultural Union indicated that there great concern from farmers who are members of their organization on possible radiation impacts from exploration and mining involving nuclear fuel minerals (e.g., uranium).	The concerned project only targets base and rare metals and precious metals. As such potential impacts from radiation emitting sources are highly unlikely.
Exploration technique	Mr. Wildfried Pack mentioned some companies who have worked in the area before, highlighting that there was often no outcome. Therefore he suggested that it is better for companies to rather do airborne surveys, like DESMEX are doing in another area in Gobabis, then it will be beneficial.	This point was noted.

### 5.3 Stakeholders and Interested & Affected Parties (I&APs)

OMAVI identified stakeholders from national, regional and local organs of state as well as other members of the public, i.e., interested and affected parties (I&APs) who were deemed relevant to the proposed activity, to form the initial stakeholder / I&APs' List. This list was constantly updated by adding names of other members of the public who reached out in response to the public notices as well as those who attended the public consultation meeting. A summary of I&APs identified are presented below and the complete stakeholders list is provided in **Appendix D**.



Figure 5-1: Some site notices put out during the public consultation process, including Witvlei Nampost, along the D1663 to the EPL and at the Omaheke Regional Council.

## 6 IMPACT IDENTIFICATION AND ASSESSMENT

The proposed project activities are associated with different environmental impacts, whether positive or negative. The general aim of an environmental assessment is to assess these impacts, mainly the negative ones as they are likely to cause more damage to the environment if measures are not properly implemented. This is done to ensure that the potential negative impacts are adequately addressed, so that impact significance is brought under control, while maximizing the positive impacts.

The potential positive and negative impacts that have been identified from the proposed exploration activities are as follows:

### **Potential positive impacts:**

- Socio-economic development through employment creation and skills transfer.
- Increased support for local businesses through the procurement of consumable items such as Personal Protective Equipment (PPE), machinery spare parts, lubricants, etc.
- Contribution towards national economy through the payment of taxes and royalties to the Government (through the Ministry of Mines and Energy).
- Improved geological understanding of base metals associated with the Kalahari Copper Belt, especially given that it is concealed by Kalahari cover.

### **Potential negative impacts:**

- **Physical land / soil disturbance:** The invasive exploration techniques such as drilling and clearing for minor access roads and temporary camps can potentially lead to disturbance of soils or land.
- **Impact on local biodiversity (fauna and flora):** the removal of vegetation that may be found within the project footprints. The moving of some site rocks may lead to loss of habitats for small animal species like reptiles that live under these rocks. Movement of heavy project vehicles may disturb the local livestock and wildlife around the project site. Loss of wild life to poaching due to presence of exploration workforce.
- **Soil and water resources pollution:** the potential risk of hydrocarbon spillages, drilling fluids, wastewater in the working areas and workshops if not properly managed may contaminate the site soils and eventually reach groundwater systems.
- **Impact on service infrastructure such as local roads:** the temporary potential increase in vehicular traffic during exploration may exert additional pressure on the local roads, especially by heavy vehicles such as trucks carrying project materials, equipment (drilling rig).

- **Air quality issue:** potential dust generated from project vehicles and activities such as drilling could compromise the surrounding air quality.
- **Noise:** potential increase in noise levels from project vehicles and machinery may be a nuisance to the locals.
- **Visual / aesthetic impact:** the presence of project vehicles and equipment in the area may be an eyesore to travellers (including tourists).
- **Environmental pollution** through different types of waste generated on the site if not properly management or disposed.
- **General social nuisance to landowners:** Potential trespassing by the project personnel. Poor communication between the Proponent and the occupier of land with regards to the project activities could result in long-terms unresolved conflicts.
- **Archaeological or cultural heritage** impact through unintentional uncovering of unknown archaeological objects or sites by certain project activities.
- **Health and safety hazards** to personnel associated with the movement / operating of machinery. Not only to project personnel but also residents (locals) in the affected area.

## **6.1 Impact Assessment Methodology**

The methodology used to assess and determine the significance of the above-listed potential project impacts on the biophysical and social environmental components is as explained below.

### **6.1.1 Impact Assessment Screening**

The potential impacts identified by Interested and Affected Parties (I&APs), presented as issues during public consultation period and by OMAVI Consultants based on professional experience was screened according to a set of questions (**Figure 6-1**). This resulted in highlighting the key impacts requiring further detailed assessment of each impact in the respective sections of this chapter.

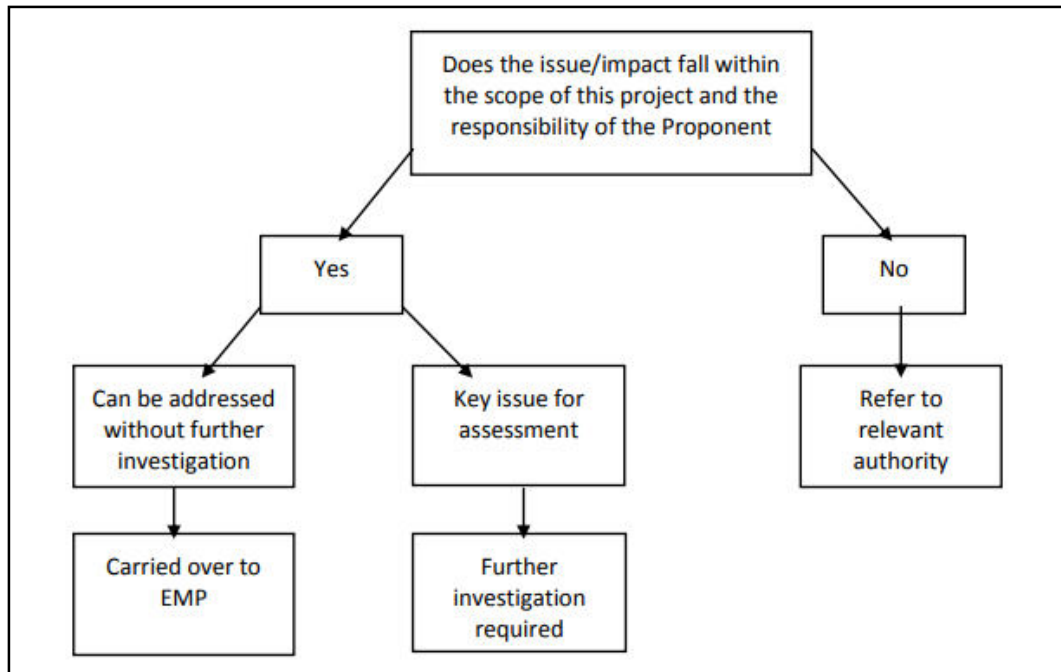


Figure 6-1: Screening process for determining key impacts (source: Resilient Environmental Solutions, 2019)

### 6.1.2 Impact Assessment Criteria

The methodology employed for this assessment was adopted from other environmental assessment reports based on research and analysis of other consultants' reports (GCS Water & Environmental Consultants, 2017a) on the suitable project impacts' assessment methodology.

The proposed exploration activities will likely to some scale/extent (spatial scale), magnitude (severity) and duration (temporal scale) have impacts on certain biophysical and social components. The potential impacts were assessed as per criteria presented in Table 6-1. To enable a scientific approach to the determination of the environmental significance, a numerical value is linked to each rating scale. This methodology ensures uniformity and that potential impacts can be addressed in a standard manner so that a wide range of impacts are comparable.

It is assumed that an assessment of the significance of a potential impact is a good indicator of the risk associated with such an impact. The following process will be applied to each potential impact:

- Provision of a brief explanation of the impact.
- Assessment of the pre-mitigation significance of the impact; and
- Description of recommended mitigation measures.

The recommended mitigation measures prescribed for each of the potential impacts contribute towards the attainment of environmentally sustainable operational conditions of the project for various features of the biophysical and social environment.

Table 6-1: Impact Assessment Criteria employed to assess the potential negative impacts

Nature	Description	Rating
<b>Extent (Spatial scale)</b>	An indication of the physical and spatial scale of the impact.	<p><b>Low (1):</b> Impact is localized within the site boundary; Site only.</p> <p><b>Low/Medium (2):</b> Impact is beyond the site boundary; Local.</p> <p><b>Medium (3):</b> Impacts felt within adjacent biophysical and social environments; Regional.</p> <p><b>Medium/High (4):</b> Impact widespread far beyond site boundary; Regional</p> <p><b>High (5):</b> Impact extend National or over international boundaries.</p>
<b>Duration</b>	The timeframe, over which the impact is expected to occur, measured in relation to the lifetime of the project.	<p><b>Low (1):</b> Immediate mitigating measures, immediate progress</p> <p><b>Low/Medium (2):</b> Impact is quickly reversible, short-term impacts (0-5 years)</p> <p><b>Medium (3):</b> Reversible over time; medium term (5-15 years).</p> <p><b>Medium/High (4):</b> Impact is long-term.</p> <p><b>High (5):</b> Long term; beyond closure; permanent; irreplaceable or irretrievable commitment of resources</p>
<b>Intensity, Magnitude / Severity (Qualitative criteria)</b>	The degree or magnitude to which the impact alters the functioning of an element of the environment. The magnitude of alteration can either be positive or negative	<p><b>Medium/low (4):</b> Low deterioration, slight noticeable alteration in habitat and biodiversity. Little loss in species numbers.</p> <p><b>Low (2):</b> Minor deterioration, nuisance or irritation, minor change in species / habitat / diversity or resource, no or very little quality deterioration.</p>
<b>Probability of occurrence</b>	Probability describes the likelihood of the impacts occurring. This determination is based on previous experience with similar projects and/or based on professional judgment	<p><b>Low (1):</b> Improbable; low likelihood; seldom. No known risk or vulnerability to natural or induced hazards.</p> <p><b>Medium/low (2):</b> Likely to occur from time to time. Low risk or vulnerability to natural or induced hazards.</p>



Nature	Description	Rating
		<p><b>Medium (3):</b> Possible, distinct possibility, frequent. Low to medium risk or vulnerability to natural or induced hazards.</p> <p><b>Medium/High (4):</b> Probable if mitigating measures are not implemented. Medium risk of vulnerability to natural or induced hazards.</p> <p><b>High (5):</b> Definite (regardless of preventative measures), highly likely, continuous. High risk or vulnerability to natural or induced hazards.</p>

### 6.1.3 Impact Significance

This is determined through a synthesis of the above impact characteristics (in Table 6-1 above). The significance of the impact “without mitigation” is the main determinant of the nature and degree of mitigation required. As stated in the introduction to this chapter, for this assessment, the significance of the impact without prescribed mitigation actions was measured.

Once the above factors (Table 6-1) have been ranked for each potential impact, the impact significance of each is assessed using the following formula:

$$SP = (\text{magnitude} + \text{duration} + \text{scale}) \times \text{probability}$$

The maximum value per potential impact is 100 significance points (SP). Potential impacts were rated as high, moderate, or low significance, based on the following significance rating scale (Table 6-2).

Table 6-2: Impact significance rating scale

Significance	Environmental Significance Points	Colour Code
High (positive)	>60	H
Medium (positive)	30 to 60	M
Low (positive)	<30	L
Neutral	0	N
Low (negative)	>-30	L
Medium (negative)	-30 to -60	M
High (negative)	>-60	H

For an impact with a significance rating of high, mitigation measures are recommended to reduce the impact to a low or medium significance rating, provided that the impact with a medium significance rating can be sufficiently controlled with the recommended mitigation measures. To maintain a low or medium significance rating, monitoring is recommended for a period to enable the confirmation of the significance of the impact as low or medium and under control.

The assessment of the project impacts is done for both pre-mitigation (before implementing any mitigation) and post-mitigation (after mitigations are effectively implemented). The potential impacts listed under section 6.1 above are described and assessed under the subsequent sections.

## 6.2 Positive Impacts: Description and Assessment

### 6.2.1 Socio-economic development (Employment and Social Responsibilities)

The exploration activities will create some temporary job opportunities for the locals (both skilled, semi and unskilled), resulting in socio-economic development through employment creation and skills transfer. The income earned by the employed locals (workers) will positively impact their lives, individually and that of their households (families). This impact is assessed as follows.

Table 6-3: The impact of the project on employment.

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
<b>Pre mitigation</b>					
<b>Post mitigation</b>	Local to regional	Short term for exploration but potentially long term	To bring noticeable changes	Definite employment if project is approved.	
<b>Mitigation measures</b>					
<ul style="list-style-type: none"> <li>Namibian citizens and permanent residents from the area should be employed for the unskilled labour preferentially to out-of-area people (outsiders) where possible. Out-of-area employment should be justified, for example by the unavailability of local skills only.</li> <li>- Equal opportunities should be provided for both men and women, the youth and people living with disability when and where possible.</li> </ul>					

### 6.2.2 Socio-economic development (Value Added Taxes and Royalty)

The continued contribution to the national economic development through annual levies paid to the Government (through the Ministry of Mines and Energy) for Exclusive Prospecting Licenses (EPLs). The impact assessment is as follows:

Table 6-4: Assessment of the positive impact of the project on VAT and royalties.

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
<b>Pre mitigation</b>					
<b>Post mitigation</b>	National	Short term for exploration but	To bring noticeable changes	Definite contributions if project is	

		potentially long term		approved and client is compliant.	
<b>Mitigation measures</b>					
<ul style="list-style-type: none"> <li>The Proponent to ensure compliance with their project's requirements of annual levies by the Ministry of Mines and Energy.</li> </ul>					

### 6.2.3 Improved geological understanding of the site

The geological information reviewed and gathered during the exploration phase will be made available to the Ministry of Mines and Energy. The Ministry would then consolidate the information as a public institution for archiving and future use a baseline for projects or educational research. This impact is assessed as follows:

Table 6-5: Assessment of the positive impact of improving geological knowledge.

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation					
Post mitigation	Regional to national	Long term knowledge	Valuable improvement of exploration in the area.	Definite knowledge if project is approved.	
<b>Mitigation measures</b>					
<ul style="list-style-type: none"> <li>The Proponent to ensure quarterly reporting for availability and accessibility of exploration findings to the Ministry of Mines and Energy (Mines Department) and possibly Geological Survey of Namibia for archiving.</li> </ul>					

## 6.3 Negative Impacts: Description and Assessment

The potential negative impacts have been described and assessed. The mitigation measures have also been provided under each assessed impact. These measures are then "translated" into management plan actions in the project's Environmental Management Plan (EMP).

### 6.3.1 Impact on Groundwater Quantity (Over-abstraction)

The planned exploration works will require about 2m<sup>3</sup> of water daily, for domestic use by the exploration team staying onsite. Additionally, once the drilling phase commences, an additional 75m<sup>3</sup> will be required daily for the actual drilling, cleaning and cooling off equipment. It is proposed that this water be bought from farmers, from existing local boreholes, subject to granting of permission by the farmers. If this option does not materialise, the proponent will drill a new borehole on the EPL. This will require a comprehensive groundwater study for the area to be conducted upon granting of the ECC, and to ensure that all necessary permitting is in place. The third option would be to cart water from outside, should the first two options not materialise.

Abstraction of water whether from an existing or new borehole, if not done as per the permitted volumes can lead to over-abstraction and put pressure on the aquifer. Therefore it can be said that without the implementation of any mitigation measures (presented in Table 6-6), the impact can be rated as high, but upon effective implementation of the recommended measures, the impact significance would be reduced to low as presented in the Table 6-6 below.

Table 6-6: Assessment of the project impact on water resources abstraction (quantity)

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	M - 3	M - 6	M - 3	M - 36
Post mitigation	L - 1	L/M - 2	L - 2	L/M -2	L - 10
<b>Mitigation measures</b>					
<ul style="list-style-type: none"> <li>For the option of buying water from the farmers, the proponent must ensure that the existing Groundwater Abstraction and Use Permit (GWAUP) conditions are adhered to.</li> <li>For the option of drilling new boreholes for the project, a comprehensive groundwater study must be undertaken for the area, to assess the aquifer potential and advise the siting of borehole and a GWAUP be obtained from the national Department of Water Affairs (DWA). The boreholes should be carefully sited, drilled, installed and their sustainable yields determined during the aquifer test (pumping test) by a qualified and experienced hydrogeologist. The hydrogeologist will then recommend a safe (sustainable) abstraction yield for the site to the Proponent to ensure that the local aquifers are not stressed, i.e. not negatively impacted by this local abstraction.</li> <li>In the Permit, the Water Regulatory Authority would set objectives (abstraction targets), conditions, annual abstraction threshold, monitoring requirements and enforce compliance by the Proponent. <b>It is important that the Proponent strictly adhere to the abstraction volumes given in their water permit and if possible, use less water.</b></li> <li>The groundwater abstraction and use should be controlled by the Water Act which states that all activities that use water for commercial purposes, requires a Water Abstraction and Use Permit from the Department of Water Affairs' Directorate of Water Resources Management.</li> <li>As part of the commercial water user's responsibilities, an annual report that includes water returns and any new changes to the water use should be prepared and submitted to the responsible unit of the DWA. Reporting will be used as a tool by the Regulatory Authority to ensure that monitoring implementation is effective, and that the Proponent commits and complies with the water resources management legislation. This action also enables the Authority to make further informed decisions on groundwater management and protection.</li> <li>Water reuse/recycling methods should be implemented as far as practicable such that the water used to cool off exploration equipment should be captured and used for the cleaning of project equipment, where possible.</li> <li>Water storage tanks should be inspected daily to ensure that there is no leakage, resulting in wasted water on site.</li> <li>Water conservation awareness and saving measures training should be provided to all the project workers so that they understand the importance of conserving water and become accountable.</li> <li><b>Groundwater Monitoring:</b> please refer to the EMP and Groundwater Assessment Report for monitoring exercises recommended during the mining phase.</li> </ul>					

### 6.3.2 Physical Disturbance of land and soils

Possible soil disturbance can result from invasive exploration techniques such as drilling and clearing survey lines for ground based geophysics, for minor access roads and temporary camps which can leave the soils exposed and vulnerable to erosion.

This impact will be localized therefore reducing the extend and soil vulnerability to erosion. The impact can be rated as medium if no mitigation measures are implemented. However, with the effective implementation of mitigation measures and monitoring, the impact significance can be reduced to low, as assessed in Table 6-7.

Table 6-7: Impact assessment of project activities on soils (physical disturbance)

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
<b>Pre mitigation</b>	M - 3	M/H - 4	L/M - 4	M/H - 4	M - 44
<b>Post mitigation</b>	L/M - 2	M - 3	L - 2	L/M - 3	L - 21
<b>Mitigation measures</b>					
<ul style="list-style-type: none"> <li>Project vehicles/machinery should stick to existing access roads and those meant for the project operations and not unnecessarily create further tracks on site by driving everywhere resulting in loosening of soil.</li> <li>Soils that are not within the intended and targeted footprints of the site areas should be left undisturbed and soil conservation implemented as far as possible.</li> <li>Stockpiled topsoil and overburden waste rocks should be used to backfill the explored and disturbed site areas/spots to allow the soil to regenerate.</li> </ul>					

### 6.3.3 Soils and Water Resources Pollution

The anticipated potential sources of pollution for both soil and groundwater are hydrocarbon fuels from project vehicles, machinery, and equipment, drilling fluids, potential wastewater/effluent from exploration and to a lesser extent from portable toilets. The spills from these machinery, vehicles and equipment (depending on volumes spilled on the soils) could infiltrate into the ground through primary porosity (in areas that are underlain by Kalahari sediments) or through fractures and faults (that act as conduits for contaminants), and with time could travel to reach further groundwater systems in the area. This will only occur if there is improper storage and handling of hydrocarbons (fuel) which could result in spills, or wet waste such as effluents on project sites. Another source could be over-abstraction (without recharge), which could result in increased concentrations of chemical constituents (increased TDS, salinity, etc).

The Groundwater Resources Vulnerability Map of Namibia shows that the vulnerability of groundwater to pollution in the project area is moderate. The main majority of the project area is covered by impervious rocks, which have low ability to conduct fluids.

Based on the above description of the impact, it can be concluded that without implementing any measures to avoid or minimize the impact, the impact significance will be slightly high to moderate and once the recommended mitigation measures have been implemented, the significance will be reduced to low. The assessment also presented in Table 6-8 below.

Table 6-8: Assessment of the project impact on soils and water resources (quality)

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	M - 3	M/H - 8	M/H - 4	M - 56
Post mitigation	L/M - 2	L/M - 2	L - 2	L/M - 2	L - 12
<b>Mitigation measures</b>					
<ul style="list-style-type: none"> <li>• Spill control preventative measures should be in place on site to management soil contamination, thus preventing and or minimizing the contamination from reaching groundwater bodies. Some of the soil control preventative measures are: <ul style="list-style-type: none"> <li>✓ Exploration site areas where hydrocarbons will be utilized should be lined with concrete or other impervious material (e.g., an HDPE liner), carefully placed to minimize risk of puncturing, to prevent any spillages from getting into direct contact with the soils and prevent eventual infiltration into the ground.</li> <li>✓ Oil use and storage locations should be visually inspected for container or tank condition and spills.</li> <li>✓ Allocate soil removal tools for polluted soils, specific the different surfaces (soil or hard rock cover)</li> <li>✓ Maintain equipment and fuel storage tanks to ensure that they are in good condition thus preventing leaks and spills.</li> <li>✓ Maintain a fully provisioned, easily accessible spill kit. Spill kits should be located throughout the active project sites (should contain the floor dry absorbent material and absorbent booms, pads, mats). These would be suitable for ground surface areas that are covered mainly by hard rocks.</li> <li>✓ All project employees should be sensitized about the impacts of soil pollution and advised to follow appropriate fuel delivery and handling procedures.</li> <li>✓ The Proponent should develop and prepare countermeasures to contain, clean up, and mitigate the effects of an oil spill. This includes keeping spill response procedures and a well-stocked cache of supplies easily accessible.</li> <li>✓ Ensure employees receive basic Spill Prevention, Control, and Countermeasure (SPCC) Plan training and mentor new workers as they get hired.</li> </ul> </li> <li>• Project machines and equipment should be equipped with drip trays to contain possible oil spills when operated on site.</li> <li>• The drill holes for exploration will be cased and welded with steel caps, and while this serves the purpose of stabilization of the hole, it also reduces the risk of infiltration of drilling fluids.</li> <li>• All wastewater and hydrocarbon substances and other potential pollutants associated with the project activities should be contained in designated containers on site and later disposed of at nearby approved waste sites in accordance with MAWLR's Water Environment Division standards on waste discharge into the environment. This is to ensure that these hazardous substances do not infiltrate into the ground and affect the local groundwater quality.</li> <li>• Wastewater from drilling should be recycled where possible, and effluent must be contained and allowed to evaporate after use. The drill-sludge or mud will be disposed of at the nearest municipal waste disposal site.</li> </ul>					



- In cases of accidental fuel or oil spills on the soils from site vehicles, machinery and equipment, the polluted soil should be removed immediately and put in a designate waste type container for later disposal as per the preceding bullet point. The removed polluted soil should either be completely disposed of or cleaned and returned to where it was taken from on site or can be replaced with a cleaner soil. This is to ensure that the pollutants contained into the soil does not infiltrate into the site soils and eventually reach to groundwater.
- Although fuel (diesel) required for exploration equipment will be stored in a tank mounted on a mobile trailer, drip trays must be readily available on this trailer and monitored to ensure that accidental fuel spills along the tank trailer path/route around the exploration sites are cleaned on time (soon after the spill has happened).
- Polluted soil must be collected and transported away from the site to an approved and appropriately classified hazardous waste treatment facility.
- Washing of equipment contaminated hydrocarbons, as well as the washing and servicing of vehicles should take place at a dedicated area, where contaminants are prevented from contaminating soil or water resources.
- Ablution facilities should be properly installed and used according to the supplier's instructions and should be regularly inspected for any leakages.
- Portable toilets should be checked regularly and should be transported and emptied at the nearest disposal pond before they are full to capacity.

#### **6.3.4 Impact on Biodiversity (Fauna and Flora)**

The proposed activities have the potential to impact both surrounding fauna (animals) and flora (vegetation) and these are described below.

##### **6.3.4.1 Fauna**

The project site is on commercial farms, where farming is practiced for both large stock (cattle) farming and small stock (goats and sheep) farming. Many farms in the area also practice game ranching. The presence of project personnel and vehicles may disturb domestic animals and scare away the wild animal, thereby disturbing the hunting activities. Illegal hunting or poaching may also be experienced.

Another potential impact of the project activities is the faunal habitat loss especially for reptiles and small mammals that live under the targeted rock units on the EPL. Although this impact may not be entirely avoidable, the workers will need to be educated on the importance of conserving faunal biodiversity by not killing any of the small mammals or reptiles encountered while performing their tasks. These animals may be trying to migrate from the targeted and disturbed rock outcrops to seek shelter and habitat elsewhere, therefore, the workers (project personnel) will be sensitized to not harm them in any way.

### 6.3.4.2 Flora

This impact is anticipated through the clearing of land for minor access roads to specific targeted sites, to create working space for rigs and for the creation of temporary camps. This impact is anticipated to be minimal, because the clearing will only be done if and when necessary for selected sites.

Consequently, the impact on flora would be of slightly medium significance with no mitigation measures in place for implementation to protect the existing vegetation. This conclusion would also apply to the existing fauna (both farm livestock and wild species). Therefore, to reduce the pre-mitigation impact significance from medium to low, the recommended measures in Table 6-9 below will need to be effectively implemented.

Table 6-9: Impact assessment of project activities on biodiversity.

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	M - 4	L/M - 4	M - 3	M - 33
Post mitigation	L/M - 2	L/M - 2	L - 2	L/M - 2	L - 12

**Mitigation measures**

**Flora**

- The Proponent should avoid unnecessary removal of vegetation, thus promoting a balance between biodiversity and their operations.
- Vegetation found on the site, but not in the targeted exploration areas should not be removed but left to preserve biodiversity on the site.
- If targeted rock units have protected or special plants, the proponent should seek a specialist opinion on how to preserve that plant species, with possible relocation.
- The movement of vehicles and machinery should be restricted to existing roads and if necessary, newly established tracks only to prevent unnecessary damage to the site vegetation.
- No onsite vegetation should be cut or used for firewood related to the project's operations. The Proponent should provide firewood for his onsite camping workers from authorized firewood producer or seller.
- Grasses and soils removed from camping areas, access roads and drilling sites must be stockpiled for backfilling once the site is vacated, to allow regeneration.
- Plant species with protected status should be avoided at all cost.
- **Cleared vegetation that might be of interest to the biomass or coal production must be gathered and handed over to ensure harmonious continuation of both activities.**

**Fauna**

- All site personnel (including contractor and visitors) associated with the exploration project should undergo full registration and must wear their identification tags at all times on site.
- Site personnel should refrain from killing/poaching or snaring or intentionally disturbing local animals that may be found on and around the exploration sites.
- Workers should refrain from killing species (big or small and all types) that may be found on and around the site.
- Workers should refrain from disturbing, killing or stealing locals' animals and killing small soil and rock outcrops' species found on sites.

- Environmental awareness on the importance of biodiversity preservation should be provided to the workers.
- Working sites should be fenced off to keep wild and domestic animals out.
- Notice should be given at least two (2) weeks in advance to indicate the flying times for geophysical surveys, so that these surveys do not coincide with hunting seasons to scare away the animals.
- 

### 6.3.5 Impact on road infrastructure -Vehicular Traffic

The EPL 8786 can be accessed from Windhoek via the B6 highway, onto the D1663 district gravel road and it is also dissected by various farm roads that are well maintained and in good condition. Project vehicles and rig bearing trucks will utilize these road, which could add pressure to the roads and potentially increase slow moving heavy vehicular traffic.

However, it will only be during the later stages of exploration and for a short period that the heavy trucks will be transporting materials and equipment to site. Therefore, the risk is anticipated to be short-term, not frequent, and therefore of medium significance.

Pre-mitigation, the impact can be rated medium and with the implementation of mitigation measures, the significance will be low as assessed in Table 6-10 below.

Table 6-10: Vehicular traffic impact assessment

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
<b>Pre mitigation</b>	M - 3	M/H - 4	L/M - 4	M/H - 4	M - 44
<b>Post mitigation</b>	L/M-2	L/M - 2	L - 2	L/M - 2	L - 12
<b>Mitigation measures</b>					
<ul style="list-style-type: none"> <li>• The heavy truck loads should comply with the maximum allowed limit while transporting exploration materials, equipment and machinery on the public and access roads.</li> <li>• Drivers of all project vehicles should be in possession of valid and appropriate drivers' licenses.</li> <li>• Vehicle drivers should adhere to the road safety rules.</li> <li>• Drivers should drive slowly (40km/hour or less), and on the lookout for livestock and wildlife.</li> <li>• The Proponent should ensure that the site access roads are well equipped with temporary road signs condition to cater for vehicles travelling to and from site throughout the project's life cycle</li> <li>• Project vehicles should be in a road worthy condition and serviced regularly to avoid accidents because of mechanical faults of vehicles.</li> <li>• Vehicle drivers should only make use of designated site access roads provided.</li> <li>• Vehicles drivers should not be allowed to operate vehicles while under the influence of alcohol.</li> <li>• Sufficient parking area for all project vehicles should be provided for and clearly demarcated on sites.</li> <li>• The Proponent should make provision for safe materials and equipment offloading and loading areas on sites.</li> <li>• No heavy trucks or project related vehicles should be parked outside the project site boundary or demarcated areas for such purpose.</li> </ul>					

- Truck movements, frequency, times, and routes should be carefully planned and scheduled not to interfere with the farm activities such as leisure and hunting – please refer to the next point.
- To control traffic movement on site, deliveries from and to site should be carefully scheduled. This should optimally be during weekdays and between the hours of 8am and 5pm.
- The site access road(s) should be upgraded to an acceptable standard to be able to accommodate project related vehicles and access permits obtained from the Roads Authority.
- The site access road(s) should be provided for in such ways that they do not interfere with other traffic movement and/or compromise traffic safety on the host farms.

### 6.3.6 Impact on air quality

The project activities and vehicles may potentially generate dust and gas emissions from vehicles (due to unpaved access roads, including the main D1663). Dust emanating from unpaved roads when transporting project equipment and supplies to and from site from time-to-time may compromise the air quality in the area.

The dust generated from operating the geological drill rigs and mining equipment could result in the production of respirable dust (particulate matter smaller than 50 µm or even 10 µm in size). This could lead to respiratory diseases such as pneumoconiosis (which includes silicosis, asbestosis, and coal miner's pneumoconiosis), and cancer (including bronchogenic carcinoma and malignant mesothelioma) in the workers.

The dust produced might also settle on nearby vegetation and may affect rates of photosynthesis and transpiration. The settled dust on plant leaves may not only affect the vegetation's functionality but animals that feed on the vegetation (i.e., browsing) too (Resilient Environmental Solutions, 2019).

Given the scale (i.e. on a small area) and nature of the activities (i.e. use of water in drilling and cutting), the impact of dust can be minimized. The impact can be rated as medium (significance) if no mitigation measures are implemented. However, once this is done, the impact significance can be reduced to low - please refer to the assessment below (Table 6-11).

Table 6-11: Air quality impact assessment

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
<b>Pre mitigation</b>	M - 3	M/H - 4	M - 6	M - 3	M - 39
<b>Post mitigation</b>	L - 1	L - 1	L - 2	L/M - 2	L - 8
<b>Mitigation measures</b>					
<ul style="list-style-type: none"> <li>• Drill equipment should be regularly maintained to ensure efficiency and reduce dust generation.</li> <li>• Dust masks, eye protective glasses and other respiratory PPE accessories should be provided to the workers on site, specifically the ones exposed to dusty site area and activities.</li> </ul>					

- The impact mitigation measures should be covered in the relevant farm access agreement as required for commercial farms.
- The Proponent should ensure that the project activities schedules are limited to the given number of days of the week, but not every day. This will keep the vehicle-related dust level minimal in the area.
- In extremely windy days, a reasonable amount of water should be used to suppress the dust that may be emanating from certain exploration areas at the sites. In other words, Dry dust suppression methods such as reasonable amount of water should be employed to minimise onsite dust generation.
- The transportation of exploration materials, equipment and machinery should be limited to certain days of the week only as so to reduce dust generated by heavy vehicles in the area.

### 6.3.7 Visual impact

The presence of project vehicles and equipment in the area may be an eyesore to travelers (including tourists). It could also come from disturbed sites by invasive exploration techniques. This impact is anticipated to be low because the techniques to be employed are minimally invasive and do not create big scares in the landscape.

Without any mitigation measures, the impact will be of slightly medium significant, but after implementing the measures, the significance will be low as assessed in Table 6-12.

Table 6-12: Visual impact assessment

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
<b>Pre mitigation</b>	L-1	L/M - 2	M - 3	M - 3	M - 18
<b>Post mitigation</b>	L - 1	L /M- 2	L /M- 3	L/M - 2	L - 12
<b>Mitigation measures</b>					
<ul style="list-style-type: none"> <li>• The Proponent should carry out progressive restoration/rehabilitation over the shortest timescale possible, to avoid excessive areas of disturbance.</li> <li>• Exploration vehicles must only move around when and if necessary to minimise interference with farm activities.</li> <li>• Residents need to be informed at least two weeks in advance that exploration operations are within 1km of their property.</li> </ul>					

### 6.3.8 Noise generation

The drilling activities as well as movements of heavy equipment and vehicles associated with the project, including aircrafts for geophysical surveys may lead to elevated noise levels, which can be a nuisance to the hosting community and the fauna. High levels of noise may also pose a health risk to workers operating within the proximity of loud equipment and machinery.

Drilling activities which is considered the main sources of noise pollution will be limited to selected areas within the EPL. An aircraft will be flown over the area for geophysical survey, however this will be for a short period of time and during a very specific period of the project. These and other activities of the project will be limited to working hours of the day only and five days in a week. With that said, noise level will be limited to the active worked sites only for the duration of the works on the sites, and therefore, the impact likelihood is minimal. With regards to project workers working with or operating noisy machines, they will be provided with appropriate personal protective equipment (PPE) during working hours and while onsite.

Without any mitigation measures being implemented, the impact is rated as of medium significance. To change the impact significance from the pre-mitigation significance to low rating, the mitigation measures have been provided for this. The impact is assessed in Table 6-13 below.

Table 6-13: Noise impact assessment

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
<b>Pre mitigation</b>	M - 3	M/H - 4	L/M - 4	M/H - 4	M - 44
<b>Post mitigation</b>	L - 1	L/M - 2	L - 2	L/M -2	L - 10
<b>Mitigation measures</b>					
<ul style="list-style-type: none"> <li>The transportation of exploration materials, equipment and machinery should be limited to once or twice a week only, but not every day to limit exposure to noise.</li> <li>Noise from project vehicles and equipment on site should be reduced to acceptable levels.</li> <li>The exploration and mining times should be set such that, no such activities are carried out during the night or very early in the mornings (to be limited between 8am and 5pm on weekdays).</li> <li>Project hours should be restricted to between 8am and 5pm to avoid noise generated by project equipment and the movement of vehicles before or after hours.</li> <li>When operating the blasting and drilling machinery onsite, workers should be equipped with personal protective equipment (PPE) such as earplugs to reduce noise exposure.</li> <li>Notice should be given at least two (2) weeks in advance to indicate the flying times for geophysical surveys.</li> <li>Notice should be given well in advance when targeted exploration sites are found to be within less than 1 km from the residence. This is done to preserve some tranquility for the residents.</li> </ul>					

### 6.3.9 Waste Generation

Waste expected to be generated during the life of this project include domestic waste, waste from exploration works (drill-sludge or mud) and sewerage waste. They should all be handled, stored and disposed off properly. The different recommendation measures are outlined in Table 6-14 below.

Without any mitigation measures, the impact significance is rated as medium, but implementation of the recommended measures, the significance will be reduced to low.

Table 6-14: Impact assessment of waste generation on the environment



Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	M/H - 4	L/M - 4	M/H - 4	M - 44
Post mitigation	L/M - 2	L/M- 2	L/M - 4	L/M -2	L - 16

**Mitigation measures**

**Domestic and general waste:**

- Different waste containers must be provided onsite for waste sorting and safe disposal of waste generated onsite.
- All domestic and general waste produced daily should be contained until such that time it will be transported to the nearest approved waste management facility designated waste sites on a weekly basis.
- After each daily works, there should not be waste left scattered on site, but rather be disposed of in allocated site waste containers
- Project workers should be sensitized to dispose of waste in a responsible manner and not to litter.
- No waste may be buried or burned on site or anywhere else throughout the project lifecycle.
- A penalty system for irresponsible disposal of waste on site and anywhere in the area should be implemented.

**Exploration (hazardous) waste:**

- The sites should be equipped with separate waste bins for hazardous waste.
- Wastewater from drilling will be recycled where possible, and effluent will be contained and allowed to evaporate after use. The will be disposed of at the nearest municipal waste disposal site.
- Hazardous waste, including emptied chemical containers should be safely stored on site where they cannot be accessed and used by uniformed locals for personal use. These containers can then be transported to the nearby approved hazardous waste sites for safe disposal. No waste should be improperly disposed of on site or in the surroundings, i.e., unapproved waste sites.
- As an emphasis on the preceding point, empty hazardous substance containers should not be disposed of anywhere on the project site or its surrounding, but instead they should be kept at a designated storing place on site until such time that they can be safely taken to the nearest approved hazardous waste sites.

**Sanitation:**

- Movable ablution facilities (mobile toilets) with septic tanks will be put up for sanitation purposes for the exploration team.
- These should be emptied at the nearest sewage pond, in good time according to manufacturers' instructions.
- The proponent will ensure that waste transport certificates are provided by the toilet contractor for sewerage waste removed from site.

### 6.3.10 Health and Safety of project personnel

Project personnel (workers) involved in the exploration activities may be exposed to cumulative health and safety risks. These are in terms of accidental injury, owing to either minor (i.e., superficial physical injury) or major (i.e., involving heavy machinery or vehicles) accidents. The site safety of all personnel will be the Proponent's responsibility and should be adhered to as per the requirements of the Labour Act (No 11 of 2007) and the Public Health Act (No. 36 of 1919).

The use of heavy equipment, especially during drilling and the presence of hydrocarbons on sites may result in accidental fire outbreaks. This could pose a safety risk to the project personnel, equipment, and vehicles too, especially considering that the area is densely vegetated and covered in grass, which can speed up the spread of fire.

The influx of people into the project area may also lead to sexual relations between these out-of-area workers and the locals. This would lead to the spreading of sexual transmitted diseases (i.e., HIV/AIDS) when engaging in unprotected sexual intercourse.

Employee safety could also be affected by the presence of dangerous animal species in the area as well as presence of the anti-poaching teams.

The impact can be rated as medium to slightly high to medium significant if no mitigation measures are implemented, but upon implementation, the impact will be of low significance (as per Table 6-15 below).

Table 6-15: Health and Safety impact assessment

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
<b>Pre mitigation</b>	M - 3	M - 3	M/H - 8	M/H - 4	M - 56
<b>Post mitigation</b>	L/M - 2	M - 3	L - 2	L/M - 3	L - 21
<b>Mitigation measures</b>					
<ul style="list-style-type: none"> <li>The Labour Act's Health and Safety Regulations should be complied with.</li> <li>As part of their induction, the project workers should be provided with an awareness training of the risks of mishandling equipment and materials on site as well as health and safety risk associated with their respective jobs.</li> <li>When working on site, employees should be properly equipped with adequate personal protective equipment (PPE) such as coveralls, gloves, safety boots, earplugs, dust masks, safety glasses, etc.</li> <li>Heavy vehicles, equipment and machinery must only be operated by personnel trained to do so.</li> <li>Heavy vehicle, equipment and fuel storage site should be properly secured, and appropriate warning signage placed where visible.</li> <li>Drilled holes that will no longer be in use or to be used later after being drilled should be properly marked for visibility and capped/closed off.</li> <li>Ensure that after completion of exploration holes, drill cuttings are put back into the hole and the holes filled and levelled.</li> <li>An emergency preparedness plan should be compiled, and all personnel appropriately trained.</li> <li>Workers should not be allowed to drink alcohol prior to and during working hours as this may lead to mishandling of equipment which results into injuries and other health and safety risks.</li> <li>Workers should not be allowed on site if under the influence of alcohol.</li> <li>The workers should be engaged in health talks and training about the dangers of engaging in unprotected sexual relations which results in contracting HIV/AIDS and other sexual related infections.</li> </ul>					

- The site to be equipped with "danger" or "cautionary" signs for any potential danger or risk area identified on site.
- Temporary enclosed boundaries should be erected around high-risk area sites for the duration of project activities at that specific site area. This is done to control access to the site, in such a way that the public, especially children do not access the site and play with equipment and machinery on days when no work is done.
- A security guard or guards should be part of the team so that they can look after the project equipment and vehicles that would be left on site in weekends or public holidays (when no work is done) to ensure that no unauthorized person enters the area.
- To discourage the unsuspecting and uniformed local community from eyeing the empty hazardous containers, the site workers should, if possible, drill holes in these containers while kept on site (before transporting the containers to the waste site).
- All employees and contractors (personnel) to be trained on environmental awareness, the Proponent's internal Environmental Health and Safety Policy, Environmental Management Plan, and engagement with key stakeholders, specifically the key government ministries and farmers.
- Employees should always work in groups and be vigilant when they move or reign the land to minimise interaction with dangerous animals.
- **Employees should wear reflective clothing to allow clear visibility by the anti-poaching unit, and must wear their identification tags at all times.**
- With regards to accidental fire outbreaks, the following should be implemented:
  - ✓ Portable fire extinguishers should be provided on sites (per vehicle and working site).
  - ✓ No open fires should be created by exploration personnel.
  - ✓ Potential flammable areas and structures such as fuel storage tanks should be marked as such with clearly visible signage.
  - ✓ A designated fire place must be established, far away from flammable products.
  - ✓ The fire place must be cleared of any grass and should have about a 5m radius of no grass or vegetation.
  - ✓ Drilling areas must be cleared of grass and other vegetation, to ensure that possible sparks that could come from drilling do not start fires.
  - ✓ Cutlines should be created to seclude the campsite from the rest of the environment so that in case of an outbreak, fires are contained.
  - ✓ In addition to fire extinguishers, buckets of sand must be available onsite to put out potential fires that could start during drilling.
  - ✓ The site must have designated smoking areas, which makes provision for cigarettes to be disposed off safely.

**6.3.11 Social Nuisance: Job seeking and Differing Norms, Culture and Values**

Like any new development for project in an area, the proposed project activities may attract a potential influx of people from outside the project area in search of job opportunities. Such influxes may lead to social annoyance and conflicts. This is generally considered a concern given the current unemployment rate of youth in Namibia, that people from other areas in different regions may hear about the project intentions (especially from the ESA newspaper adverts) and be forced to go look for work opportunities in the project area. Different people may come with different ways of living to the area, which could interfere with the local norms, culture, and values. This could potentially lead to social clashes between the locals and outsiders. Additionally, the influx of people in the area puts pressure on the existing population and could result in social ills such as sex for money, alcohol abuse etc. However, the exploration team will be small, which reduces the magnitude of this impact and the short term nature of the exploration project reduces the duration of this impact, thereby reducing its overall significance.

Additionally, the presence of some out-of-area workers may lead to social annoyance to the local community, particularly where private properties such as homes, yards/fences, vegetation, or animals (livestock and wildlife) or any properties of value to the farm owners or occupiers of the land are concerned.

Pre-implementation of mitigation measures, the impact is rated as of slightly high to medium significance. However, upon mitigation (post-mitigation) – see mitigation measures below, the significance will change from medium to low rating. The impact is assessed in Table 6-16 below.

Table 6-16: Social impact assessment of outsiders' influx into the area (job seeking)

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
<b>Pre mitigation</b>	M - 3	M - 3	M/H - 8	M/H - 4	M - 56
<b>Post mitigation</b>	L/M - 2	L/M - 2	M - 6	L/M - 2	L - 20
<b>Mitigation measures</b>					
<ul style="list-style-type: none"> <li>The Proponent should prioritize the employment of local people, and only if necessary and due to lack of skills in the area, out-of-area people can be given some of the work. This is to avoid the influx of outsiders into the area.</li> <li>The locals to be employed during the project phases should be provided with the necessary training of skills required for the project to avoid bringing in many out-of-area employees.</li> <li>Out-of-area workers that may be employed (due to their unique work skills) on site should be sensitized on the importance of respecting the local values and norms, so that they can co-live-in harmony with the local communities during the duration of their employment on site.</li> <li>No worker should be allowed to wander in people's private yards or fences without permission.</li> <li>Site workers are not allowed to kill or in any way disturb local livestock.</li> <li>No worker should be allowed to, without permission cut down or damage trees belonging either the farm owner, the neighbouring farms.</li> </ul>					

- The Proponent should inform their workers on the importance of respecting the locals' properties by not intruding or damage their homes, fences or snaring and killing their livestock.
- Any workers or site employees that will be found guilty of intruding peoples 'privately owned properties should be called in for disciplinary hearing and/or dealt with as per their employer' (Proponent)'s code of employment conduct
- Site workers should be advised to respect the community and local's private properties, values, and norms.

#### 6.4 Cumulative Impacts

According to the International Finance Corporation (2013), cumulative impacts are defined as “those that result from the successive, incremental, and/or combined effects of an action, project, or activity (collectively referred to in this document as “developments”) when added to other existing, planned, and/or reasonably anticipated future ones”.

The cumulative impacts to which the project would contributes are listed below:

- **Air quality:** The quality of air is already impacted by existing activities such as dust from unpaved roads, fumes and gases from local vehicles as well as gases released during the production of charcoal in the area. Therefore, the project vehicles and exploration activities will be contributing to this existing impact.

The potential (positive and negative) impacts stemming from the proposed exploration activities were identified. The two impact types were described, assessed and mitigation measures where provide. Therefore, conclusions and recommendations are given as per the findings of this assessment.

### 7 RECOMMENDATIONS AND CONCLUSIONS

The aim of this environmental scoping assessment was to identify the potential impacts associated with the proposed exploration activities on EPL8786, assess and recommend practical mitigation measures. The public was consulted as required by the EMA and its 2012 EIA Regulations (Section 21 to 24). The public was informed via the newspapers (*Die Republikein, Namibian Sun and Allgemeine Zeitung* for two consecutive weeks on 20th and 26th January 2023,). Site/public notices were placed at strategic localities including the Omaheke Regional Council headquarter offices in Gobabis,, Okarukambe Constituency office, Nampost office, and Municipality in Gobabis, at the settlement offices, Nampost and public clinic in Witvlei as well as along the D1 663 that goes to the EPL.

The interested and affected parties raised their comments and concerns on the proposed project activities and these were noted down during the public consultation process. The concerns and comments received from the public and the local community members formed the basis for this report and development of the Draft EMP.

The impacts assessed were found to mostly be of medium significance. The effective implementation of the recommended management actions (mitigation measures) will see the significance reduction in impacts (that cannot be avoided) from medium to low rating. However, to maintain a low significance rating, monitoring of the potential impacts by the Proponent (an Environmental Control Officer (ECO)) is highly recommended. **Monitoring will not only be carried out to maintain the low rating of impacts' significance but to also ensure that new potential impacts that might arise during project implementation are well identified in time, properly addressed and that suitable mitigation measures are provided and implemented.**

Based on the findings of this environmental assessment, it is therefore recommended that an Environmental Clearance Certificate (ECC) be issued for the proposed exploration of base and rare metals, precious metals and industrial mineral on EPL 8786 subject to the following recommendations:

- All required permits, licenses and approvals for the proposed activities should be obtained as required (please refer to the Permitting and Licensing Table in the Environmental Management Plan (Appendix C). These include permits and licenses for land/farm access agreements to explore and ensuring compliance with these specific legal requirements.
- The Proponent complies with the legal requirements governing this type of project and its associated activities.
- All mitigations provided in this ESA Report and the management action plans in the EMP should be implemented and monitoring conducted as recommended.
- All the necessary environmental and social (occupational health and safety) precautions provided should be adhered to.
- Site areas where exploration activities have ceased should be rehabilitated, as far as practicable, to their original state.
- The monitoring of the implementation of mitigation measures should be conducted, applicable impact's actions taken, reporting done and recorded as recommended in the Draft EMP.

In conclusion, it is unlikely that the proposed project activities will have a high significant of negative impact on the biophysical and social environments in the project area. Therefore, it is vital for the Proponent and their contractors (if any) to effectively implement and monitor the recommended management measures to protect the environment and promote environmental sustainability.

## 8 REFERENCES

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