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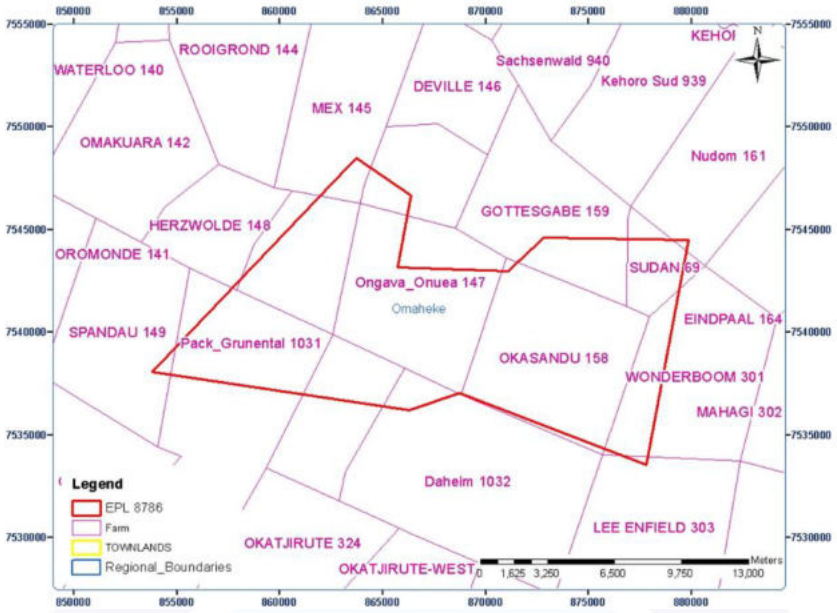

Draft Environmental Management Plan for the:

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

MEFT APPLICATION NO.:	**APP - 00834**
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DATE SUBMITTED:	March 2023
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Disclaimer:	*The data and information contained in this report is based on information provided by the project Proponent and is deemed to be correct. OMAVI shall not be held liable for any incorrect information/ data provided by the project Proponent.*

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

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.

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

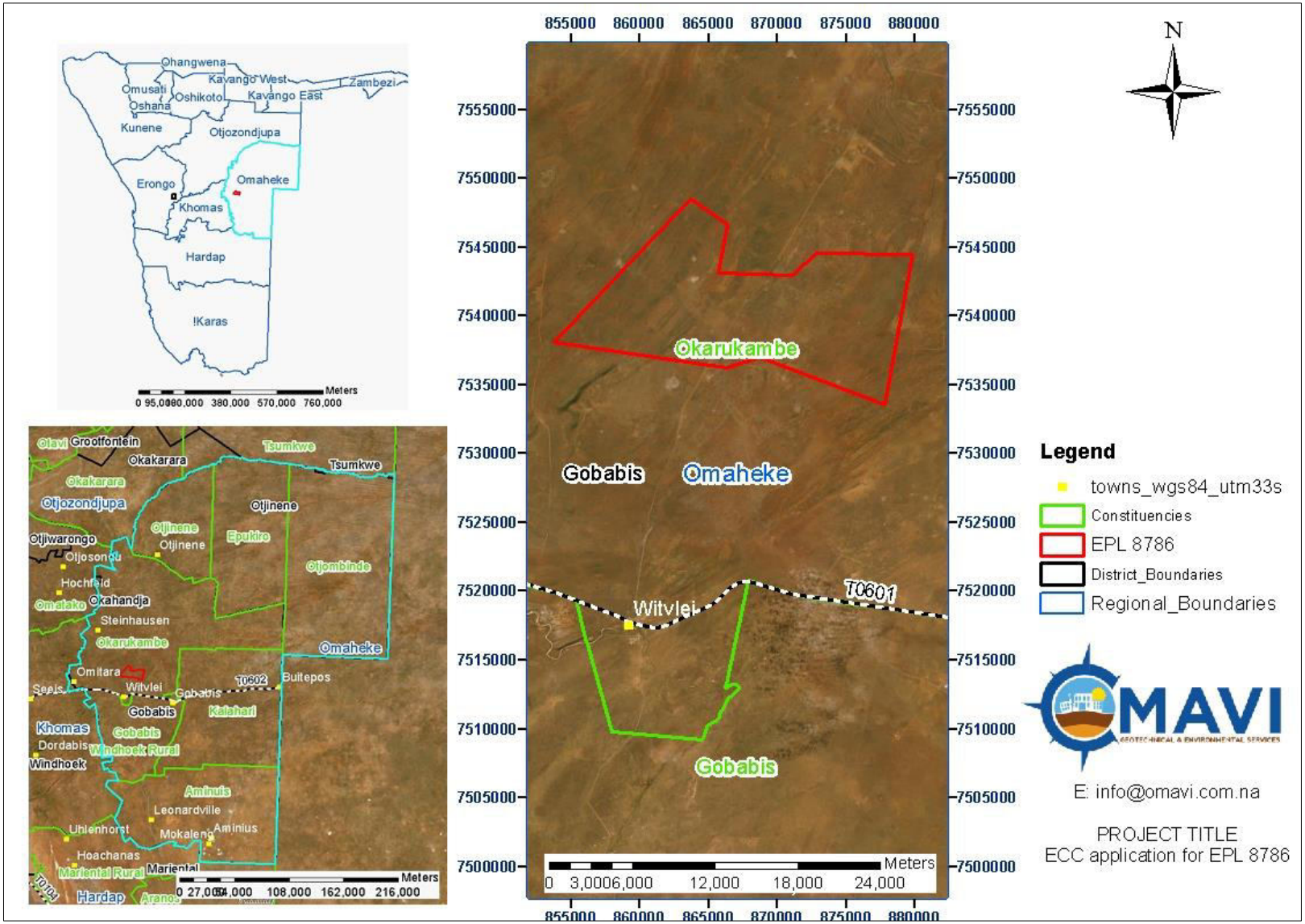

Figure 1-1: The location of EPL 8786 in the Omaheke Region Region.

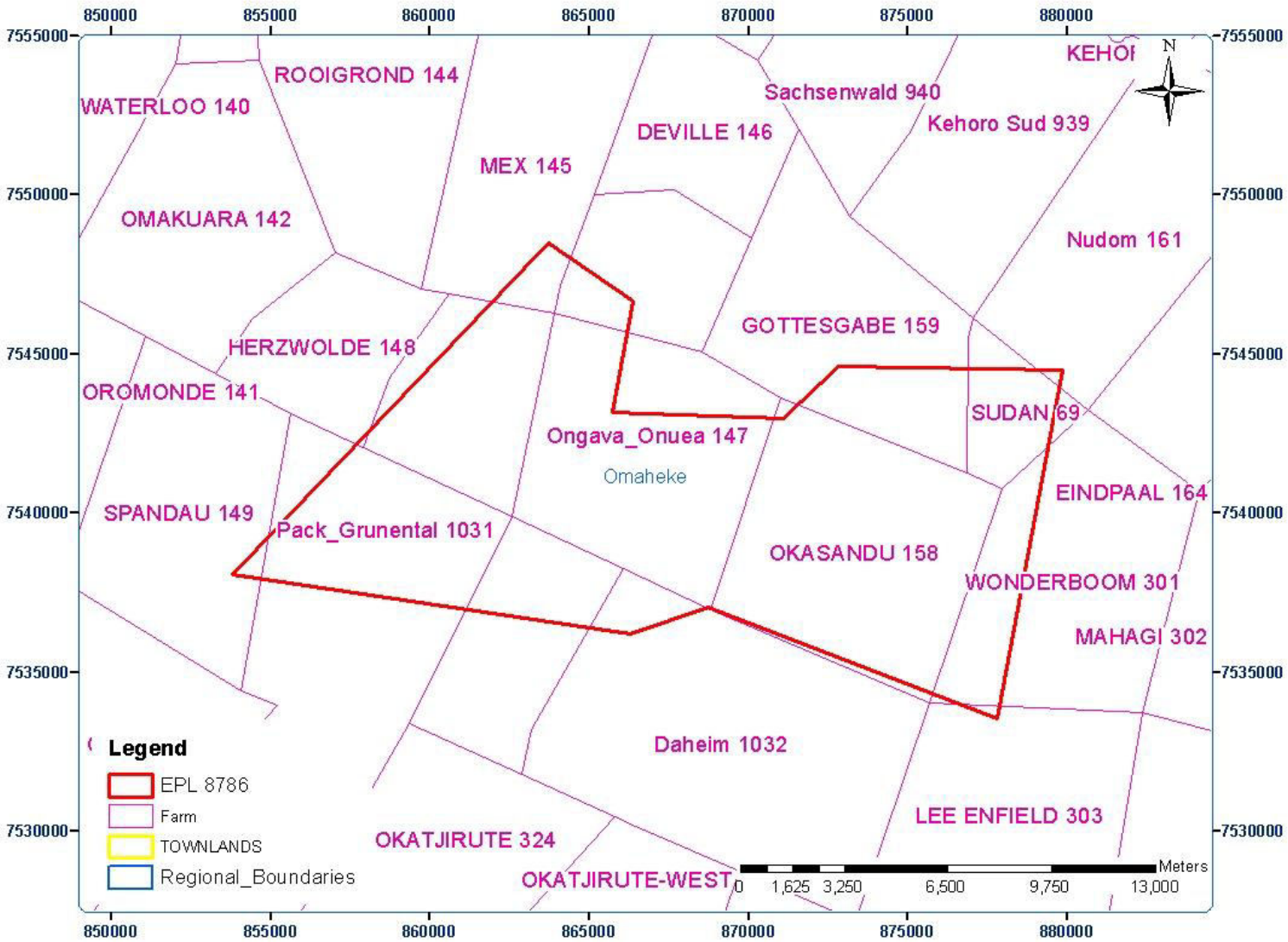

Figure 1-2: The farms that are covered by EPL 8786, including ones with minor overlaps..

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/* .

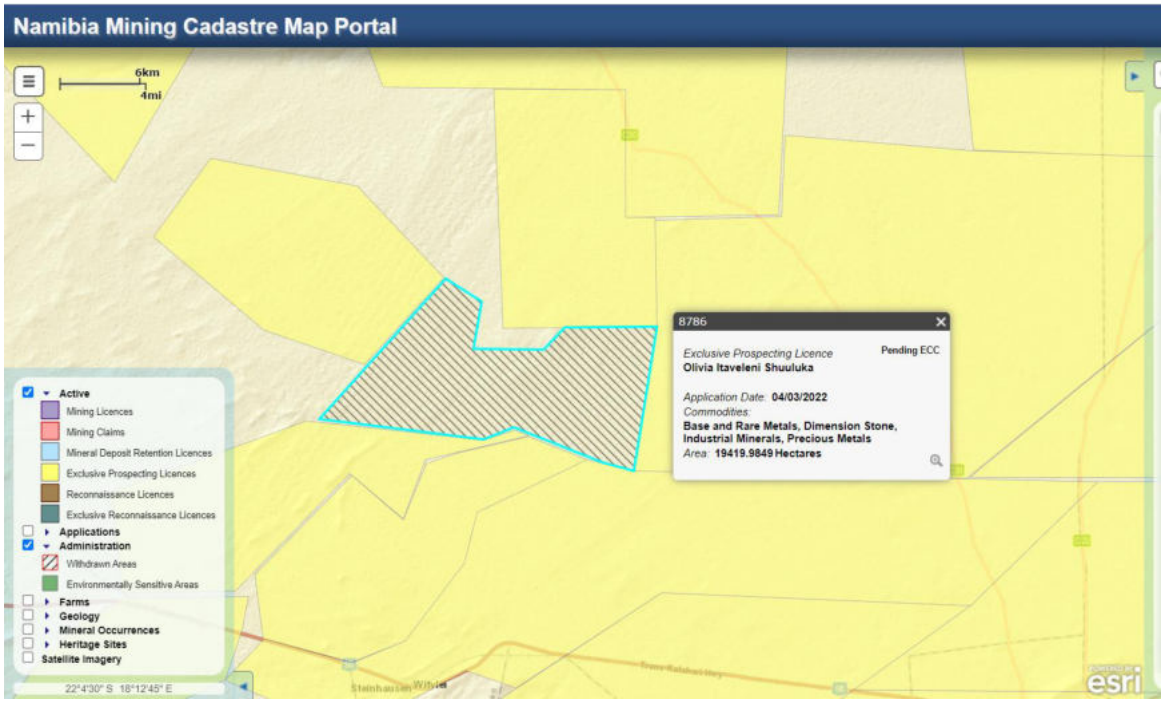

Figure 1-3: Details of EPL 8786 as displayed on the Namibia Mining Portal (As accessed on 31 January 2023 via: https://portals.landfolio.com/namibia/).

In terms of geology, theEPL 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 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 siliciclastic / carbonatic Hakos Group in the SMZ, while the Witvlei Group are restricted to the SF.

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,

It should be that an environmental scoping assessment (ESA) was done, and subsequent environmental management plan (EMP) was prepared for exploration works only. However, should a promising resource be found because of this exploration, an application will be launched with the Ministry of Mines and Energy (MME) for a mining licence, for which a separate environmental impact assessment and EMP will be done for mining. Therefore, this EMP only applies to the proposed exploration activities.

1.3 Purpose of the Environmental Management Plan (EMP)

Regulation 8 of the Environmental Management Act's (EMA) (7 of 2007) Environmental Impact Assessment Regulations (2012) requires that a draft Environmental Management Plan (EMP) be included as part of the scoping Environmental Assessment (EA) process. A 'management plan' is defined as:

"…*a plan that describes how activities that may have significant environments effects on the environment are to be mitigated, controlled and monitored.*"

An EMP is one of the most important outputs of the EA process as it synthesises all the proposed mitigation and monitoring actions, set to a timeline and with specific assigned responsibilities. It provides a link between the impacts identified in the environmental assessment process and the required environmental management on the ground during project implementation and subsequent operations. **It is important to note that an EMP is a legally binding document and a person who contravenes the provisions of this EMP may face imprisonment and/or a fine. This EMP is a living document and should be amended to adapt to address project changes and/or environmental conditions and feedback from compliance monitoring.**

The purpose of this document is therefore to guide environmental management throughout the following life-cycle stages of the proposed phases. The project phases are addressed in this EMP are as follows:

- **Planning** - the period during which preliminary legislative and administrative arrangements are carried out in preparation of exploration activities. The components that form part of this phase include obtaining land access agreements (consents) from land owners/occupiers, the preparation of worksites, setting up project infrastructure, vehicles, equipment, and machinery as well as maintenance of these infrastructure, vehicles and equipment by the Proponent, as deemed necessary.
- **Exploration phase** – during this phase, the proposed exploration works, and related activities will be carried on the targeted areas of the EPL.
- **Decommissioning and rehabilitation** – the period after which the exploration activities will be completed and during which post-exploration rehabilitation of the explored areas will be done.

1.4 The Environmental Consultant

In accordance with the Environmental Management Act (2007) of Namibia and its Regulations of 2012, Ms Olivia Itaveleni Shuuluka (the proponent) appointed OMAVI Geo-technical & Geo-Environmental consultants cc (hereinafter referred to as OMAVI) as an independent environmental consultant to conduct an Environmental Scoping Assessment and submit the required documents as part of an application for an Environmental Clearance Certificate (ECC) to the Environmental Commissioner. This EMP is one of the required documentations to the ECC application.

1.5 Limitations of the Draft Environmental Management Plan (EMP)

The following assumptions apply to this EMP:

- This report has been compiled on a scoping level for which no specialist studies were undertaken.
- The project specific information used in this document is as provided by the Proponent, from site observations, OMAVI Consultants experience, relevant literature as well as from personal communication with the farmers and 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 which led to the development of this EMP.
- It is also assumed that the relevant information obtained from different literature consulted is accurate; and
- This EMP has been compiled on an assumption that there will be no significant changes to the proposed project activities or the affected biophysical and social environment between the time of compiling this EMP and implementation of the proposed project that could substantially influence findings of this document; and
- It is also assumed that there will be no significant changes to the project activities that could substantially influence the plan actions provided herein that are aimed at the management and protection of the biophysical and social environment.

2 PROJECT DESCRIPTION, ACTIVITIES AND PROCESSES

The exploration works to be undertaken on EPL 8786 will focus on the search for Base and Rare Metals, Precious Metals, Dimension Stones and Industrial Minerals. This section discusses the activities to be undertaken for the exploration of these minerals 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.

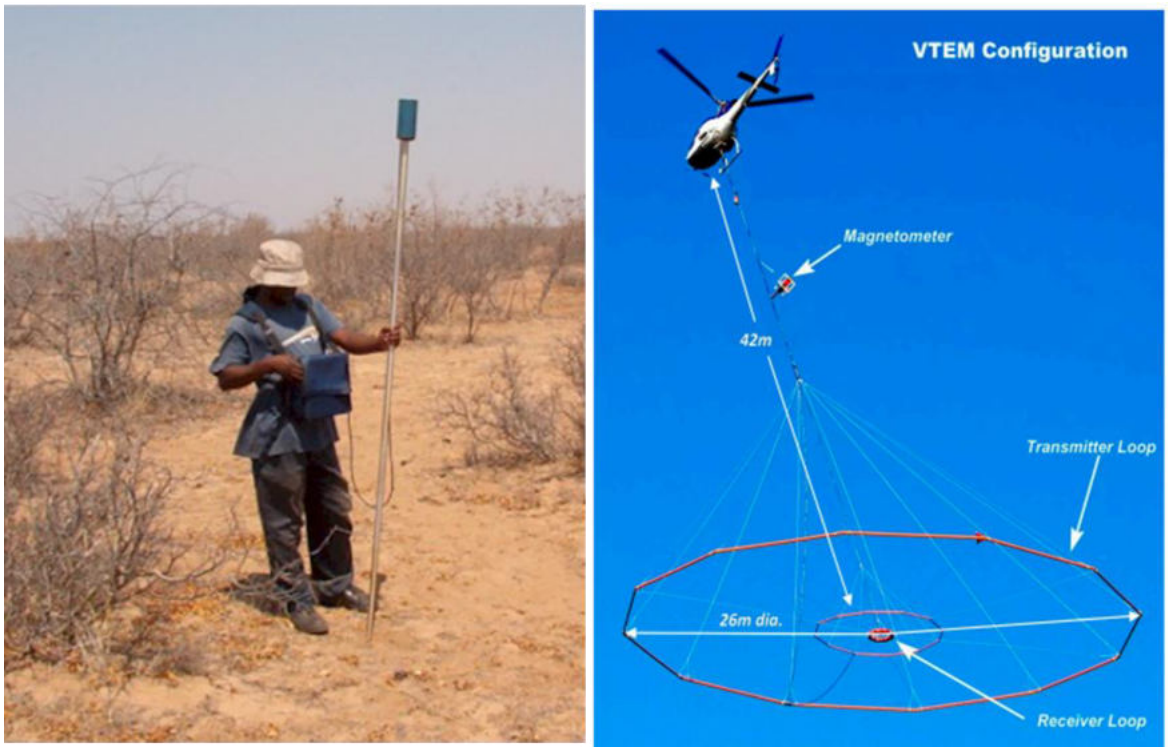

Figure 2-1: A demonstration of the two types of geophysical methods with ground-based magnetometer (left) and airborne magnetometer (right).

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 $2m^3$ daily while amounts required at drilling stage for the actual drilling, cleaning and cooling off equipment, will be about $75m^3$ 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.

3 APPLICABLE LEGISLATION: AUTHORISATION (PERMITS AND LICENSES)

This section covers information on the legal obligations (legislations, policies, and guidelines) that governs certain project activities, where permitting and/or licensing may be required from different applicable regulatory authorities - Please refer to **Table 3-1** below. The full list and description of the legal framework (where permits are required or not) is presented in the Scoping Report.

Table 3-1: Applicable legislations in terms of permits or licenses for the proposed exploration and mining activities

Legislation	Provisions	Contact Details
Environmental Management Act 2007 Environmental Impact Assessment (EIA)	Activities listed in Government Notice (GN) No. 29 of GG No. 4878 require an Environmental Clearance Certificate (ECC). The amendment, transfer, or renewal of the ECC (EMA S39-42; EIAR Regs19 & 20).	**Mr Damian Nchindo (Ministry of Environment, Forestry and Tourism's Department of Environmental Affairs and Forestry**

Legislation	Provisions	Contact Details
Regulations (EIAR) (GG No. 4878)	Amendments to this EMP will require an amendment of the ECC. **<u>The ECC needs to be renewed every 3 years.</u>**	**(DEAF) – Chief Conservation Scientist)** **Tel: (061) 284 2701**
The Water Act 54 of 1956 The Water Resources Management Act No. 11 of 2013 (unpromulgated)	The Water Act 54 of 1956 was formulated to consolidate and amend the laws relating to the control, conservation and use of water for domestic, agricultural, urban and industrial purposes; to make provision for the control, in certain respects, of the use of sea water for certain purposes; for the control of certain activities on or in water in certain areas. **Provision for a Groundwater abstraction and use permit for to be reviewed as required.**	**Mr Franciskus Witbooi (Deputy Director: Water Policy and Water Law Administration.** **Tel: (061) 208 7158**
Mineral Prospecting & Mining Act (Act No. 33 of 1992)	Section 38 (1): Applications for renewal of registration of mining claims The Proponent should ensure that all the necessary permits/authorisation for small/ medium-scale mining such as mining claim renewals are obtained from the Ministry of Mines & Energy (MME)'s Mine Directorate. Section 54(2): details provisions pertaining to the decommissioning or abandonment of a mine	**Ms Isabella Chir-Chir (Mining Commissioner)** **Tel: 061 284 8167**
	Under this Act (Section 51 (1a)), holder of a mineral license cannot exercise any rights on a private land until the holder has entered into an agreement with the owner regarding payment of compensation	**<u>The Proponent should enter into and sign access and land use agreement with respective affected farm owners as listed in the Stakeholders' (Interested and Affected Parties) list.</u>**
Road Traffic and Transport Act 52 of 1999 and its 2001 Regulations	Provides for the control of traffic on public roads and the regulations pertaining to road transport, including the licensing of vehicles and drivers. **A site access road permit should be applied for and obtained from the Roads Authority and conditions set therein to be compiled with, should any new routes be necessary.**	**Mr Eugene de Paauw (Roads Authority – Specialist Road Legislation)** **Tel.: (061) 284 7027**
Petroleum Products and Energy Act (No. 13 of 1990) Regulations (2001)	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"	**Carlo Mcleod (Ministry of Mines and Energy: Acting Director – Petroleum Affairs** **Tel.: (061) 284 8291**
Forestry Act (No. 12 of 2001)	Permits are required for the removal of protected plants species.	**The nearest Forestry Office (Ministry of Agriculture Water and Land Reform)** **Mr Joseph Hailwa (Director: Forestry), Tel: (061) 208 7663**
Nature Conservation Ordinance No. 4 of 1975 (as amended)	Permits are required for the removal of protected plants species.	
National Heritage Act (Act No. 27 of 2004)	The Act makes provision for the protection and conservation of places and objects of heritage significance and the registration of such places	**Ms. Erica Ndalikokule (Head: Heritage Management) –**

Legislation	Provisions	Contact Details
	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. Should any objects of heritage significance be identified during the exploration or mining phase, the work must cease immediately in the affected sites and **the necessary steps taken to seek authorisation from the Council**.	**National Heritage Council of Namibia** **Tel: (06) 301 903** **OR** **Mr Manfred Gaeb (Regional Heritage Officer) – National Heritage Council of Namibia** **Tel:(061) 301 903**
Labour Act 11 of 2007Health and Safety Regulations (HSR) GN 156/1997 (GG 1617).	Adhere to all applicable provisions of the Labour Act and the Health and Safety regulations.	**No permit is required, but adherence to the Act's Relevant Regulations is highly recommended.**

4 EMP IMPLEMENTATION AND RESPONSIBILITIES

A list of specific responsibilities and duties to be undertaken by each are provided in Table **4-1** below. It should also be noted that the above-mentioned roles are delegated roles and Ms Olivia Itaveleni Shuuluka is ultimately responsible for the implementation of the EMP.

Table 4-1: EMP implementation roles and responsibilities.

Role	Responsibilities
Site Manager (could be the Proponent)	● Managing the implementation of this EMP and updating and maintaining it when necessary. ● Ensure that relevant commitments contained in the EMP Action Plans are adhered to. ● Maintain records of all relevant environmental documentation for the project. ● Management and monitoring of individuals and/ or equipment on-site in terms of compliance with this EMP and issuing fines for contravening EMP provisions. ● Cooperate with all relevant interested and affected parties/stakeholders. ● Issuing fines to individuals who contravene EMP provisions and if necessary, removing such individuals from site. ● Setting up and managing the schedule for the day-to-day activities. ● Liaison with all relevant interested and affected parties/stakeholders. ● Ensuring all incidents are recorded and documented.

Role	Responsibilities
	● Undertaking an annual review of the EMP and amending the document when necessary.
Safety, Health and Environmental (SHE) Officer / Plant Operator	● Planning and carrying out site inductions to the workers on-site and visitors to the worksite(s). ● Conducting site inspections of all areas with respect to the implementation of this EMP (monitor and audit the implementation of the EMP). ● Ensure that the requirements of the EMP are carried out during applicable activities throughout the project life span. ● Advising the Project Manager on the removal of person(s) and/or equipment not complying with the provisions of this EMP. ● -Undertaking an annual review of the EMP and recommending additions and/or changes to this document. ● Monitor the overall implementation of the EMP.
Public Relations Officer (PRO)	● Liaising between the affected farmers (property owners) and/or occupiers of land and Ms Olivia Itaveleni Shuuluka ● Ensure effective communication with stakeholders (affected farmers or landowners or occupiers of land), media (if necessary) and the public. ● Managing public relations issues. ● Preparing and submitting public relations reports, if required. ● Collaborating with personnel and maintaining project-related open communication among personnel.
Archaeology personnel: for Chance Finds Procedure Implementation Roles	The following personnel have been assigned responsibilities as per the Chance Finds Procedure (**Appendix 1**) provided in the Archaeological Assessment conducted for the proposed activities: ● **Operator**: To exercise due caution if archaeological remains are found ● **Foreman**: To secure site and advise management timeously ● **Superintendent:** To determine safe working boundary and request inspection ● **Archaeologist:** To inspect, identify, advise management, and recover remains.
Department of Environmental Affairs & Forestry (DEAF: MEFT))	• -The DEAF is responsible for enforcing compliance with the EMA, its regulations and full implementation of this EMP. The competent authority also reviews Bi-Annual reports and grant ECC renewal after 3 years.
Ministry of Mines and Energy (MME)	• -Ensuring the relevant and required permits and licenses are issued to the Proponent including site inspection, when needed. This includes renewal of the mining claim License.
Department of Water Affairs: Ministry of Agriculture, Water and Land Reform	• Responsible for the provision for a Groundwater abstraction and use permits, and ammendmenfor thereof.

Role	Responsibilities
Ministry of Labour Industrial Relations and Employment Creation	• Reponsible for all round well being of employees (including fair treatment, just compesation, safety and health).
Site Workers, Contractors and Visitors	The project workers have a personal responsibility of aiding the implementation of the EMP while present and working on site. Therefore, they will be required to adhere to the relevant management and mitigation measures to collectively protect the environment and promote environmental sustainability. Site visitors should be inducted on the site operational procedures, particularly environmental, health and safety measures.

5 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN ACTIONS

This chapter presents the environmental and social mitigations measures (management plan actions) provided to avoid potential impacts where possible, and where impacts cannot be avoided, measures are provided to reduce the significance of these impacts.

These management plan actions apply to the planning, exploration and decommissioning phases of the project as summarised in **Error! Reference source not found.**, containing environmental aspect for which the management actions are required, mitigation measures, key performance indicators, responsible person(s), resources or proof and the timeline of such management actions.

Additionally, to support and ensure that the proposed mitigation measures are achieving the desired results throughout the project phases, a monitoring plan must be implemented alongside the mitigation plan. **Table 5-2** presents the required environmental monitoring in terms of each potential impact, parameters to be monitored and monitoring objective. The same table also outlines the reporting structures for monitoring, frequency, methods to be used, reporting structure, any thresholds that apply and relevant recommended actions.

Table 5-1: Management Plan Actions for the Exploration Activities on EPL 8786.

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources	Timeline
PLANNING PHASE						
EMP implementation and training	Lack of EMP awareness and implications thereof	A Comprehensive Health and Safety Plan for the project activities should be compiled. This will include all the necessary health, safety, and environmental considerations applicable to respective works on sites. An EMP non-compliance penalty system should be implemented on site. The Proponent should appoint an SHE Officer to be responsible for managing the EMP implementation and monitoring	All required Plans and systems are compiled and in place Safety, Health and Environmental (SHE) Officer is appointed	Proponent	Records of EMP implementation Plans and Systems	Pre-exploration (project activities)
Authorizations	Lack of Agreements, Permits/ Licenses	All the required agreements and licenses or permits should be applied for and signed, respectively before commencement of work on the EPL, or as required The permits, agreements referred to herein include land access & use (by land/farm or property owners or representatives of the occupiers of land) for exploration by the property owners, as well as petroleum storage permits from Ministry of Mines and Energy (MME).	Applicable permits and licenses to obtained from relevant authorities and kept on site for records keeping and future inspections Agreements signed and obtained from landowners or occupiers of land on time, **min. 2 months prior to planned commencement date of works.** **Petroleum storage permits obtained**	Proponent and or Exploration Manager	Permits and Licenses Signed Land Access and Use Agreements	Prior to exploration

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources	Timeline
Communication between the Proponent and landowners or occupiers of land	Lack of communication (proper liaison) between farmers and Proponent with regards to land use	The Proponent should appoint a Public Relation Officer (PRO) to liaise with the farmers/landowners. The PRO should be introduced to the farm owners and his or her contact details provided to them prior to undertaking activities for easy communication during the exploration activities. A clear communication procedure/plan which should include a grievance mechanism should be compiled	A PRO is appointed	PRO	Complaints logbook PRO contact details to be provided to the affected farmers/landowners	PRO appointment (Prior to project activities) and their responsibilities throughout the project activities
Employment	Creation of employment opportunities	Non-skilled labour should be sourced from the locally affected area, in accordance with procedures approved by the relevant authorities. Equal opportunity should be provided for both men and women.	Number of locals employed for exploration activities	Exploration Manager	Record of employees	Pre-project activities and when necessary, throughout
Specialised procurement of services	Exploration contractors and services	All services related to exploration activities such as drilling that the Proponent may need, preference should be given to local providers of such services. If not available locally, the services search should be extended to a regional level (Omaheke Region) and lastly, nationally, or international, if all efforts lead to no success.	Number of hired contractors	Proponent Exploration Manager	Record of hired or contracted companies or services providers	Pre-project activities and when necessary, throughout
EXPLORATION PHASE						
EMP implementation and training	Lack of EMP awareness and implications thereof	EMP trainings should be provided to all new workers on site and to old workers (as a refresher) every 6 months. All site personnel should be aware of necessary health, safety, and environmental considerations applicable to their respective work The implementation of this EMP should be monitored.	Compliance monitoring conducted monthly for the exploration phase and should be recorded	SHE Officer	Monitoring reports ECC renewed on time Records of EMP training conducted	Throughout the exploration phase

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources	Timeline
		The site should be inspected, and a compliance audit done throughout **the project activities, monthly during the exploration phase**. An EMP non-compliance penalty system should be implemented on site.	EMP Refresher training for employees/workers every 6 months Timely renewal of the Environmental Clearance Certificate (ECC) every 3 years			
Communication between the Proponent and landowners or occupiers of land	Lack of communication (proper liaison) between farmers and Proponent with regards to land use	The PRO should be introduced to the farm owners and his or her contact details provided to them prior to undertaking activities for easy communication during the exploration activities. The Proponent should compile a clear communication procedure/plan which should include a grievance and response mechanism. The Proponent should enter into a written agreement with landowners before carrying out exploration activities on their land.	PRO is part of the project personnel	PRO	Complaints logbook PRO contact details to be provided to the affected farmers/landowners	Throughout the project activities
Water Resources Use	Over-abstraction (water demand and availability)	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. **Hence the proponent is expected to obtain a copy of that ECC and water permit for the existing BH so that they too can comply with the terms and conditions stipulated therein.**	Proof/ recording/ quantification of water saving efforts.	Exploration Manager	Records of Permit issuance and renewals Groundwater Monitoring efforts	Pre-exploration phase Throughout

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources	Timeline
		For the option of drilling new boreholes for the pr.oject, 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 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. **The proponent must perform a pump test of the BH prior to operation in order to assess whether or not the meet their water demands without straining water requirements of the community.** IThe 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.				

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources	Timeline
		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. 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. Water storage tanks should be inspected daily to ensure that there is no leakage, resulting in wasted water on site. 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. **Groundwater Monitoring**: please refer to the EMP and Groundwater Assessment Report for monitoring exercises recommended during the mining phase.				

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources	Timeline
Soils	Physical soil/land disturbance and loss of topsoil	Overburden should be handled more efficiently during both exploration operations to avoid erosion when subjected erosional processes Prevent creation of huge piles of waste rocks by performing sequential backfilling. Soils that are not within the intended ad targeted footprints of the site should be left undisturbed and soil conservation implemented as far as possible. Project vehicles and machinery should stick to access roads provide and or meant for the project operations but not to unnecessarily create further tracks on site by driving everywhere resulting in soil compaction.	No proliferation of informal vehicle tracks. No new erosion gullies.	SHE Officer	Complaints logbook	Throughout the exploration phase
Soils and water resources	Soils and water resources pollution	Spill control preventive 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 preventive measures are: -Identification of oil storage and use locations on site and allocate drip trays and polluted soil removal tools suitable for that specific surface (soil or hard rock cover) on the sites. -Vehicles, machinery, equipment, and fuel storage tanks should be maintained to ensure that they are in good condition thus preventing leaks and spills. -The oil storage and use locations should be visually inspected for container or tank condition and spills. -Maintain a fully provisioned, easily accessed spill kit. Spill kits should be located throughout the active project sites contain the floor dry absorbent material	No complaints of pollutants on the soils and eventually in the water due to exploration activities No visible oil spills on the ground or contaminated/polluted spots.	SHE Officer	Complaints logbook Waste containers Non-permeable material to cover the ground surface at areas where hydrocarbons and potential pollutants are utilized.	Throughout exploration phase

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources	Timeline
		and absorbent booms, pads, mats. These would be suitable for ground surface areas that are covered mainly by hard rocks. -All project employees should be made aware of the impacts of soil pollution and advised to follow appropriate fuel delivery and handling procedures. -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. -Ensure employees receive basic Spill Prevention, Control, and Countermeasure (SPCC) Plan training and mentor new workers as they get hired in each phase of the project. Exploration site areas where hydrocarbons will be utilized, the surface should be covered with an impermeable plastic liner (e.g. an HDPE liner), carefully placed so as to minimize risk of puncturing, to prevent any spillages from getting into direct contact with the soils and prevent eventual infiltration into the ground. Project machines and equipment should be equipped with drip trays to contain possible oil spills when operated during exploration works. 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				

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources	Timeline
		these hazardous substances do not infiltrate into the ground and affect the groundwater quality. 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 int 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). The fuel storage tank should be placed on a bunded and impervious surface. 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.				

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources	Timeline
		Toilet water should be treated using one of the following methods: -discharged into chemical toilets and periodically emptied out before reaching capacity and transported to a wastewater treatment facility. -type of pit latrine (where excreta in the pit is treated to prevent the waste from being a water pollution risk).				
Biodiversity	Loss of Fauna and Flora	**Flora:** At any water course such as site creeks, streams or rivers, exploration works should not be done within 50 m of these water courses to avoid the destruction of flora habitat. 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. Movement of vehicle and machinery should be restricted to existing roads and tracks to prevent unnecessary damage to the vegetation. No onsite vegetation should be cut or used for firewood related to the project's operations. The Proponent should provide firewood for onsite camping workers from authorized firewood producers or sellers.	No disturbance to unmarked areas. No complaints from locals regarding unauthorised vegetation removal or cutting down of trees.	SHE Officer	Barricading tape (to indicate working areas) Complaint logbook	Throughout the exploration phase

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources	Timeline
		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. 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. C**leared vegetation that might be of interest to the biomass project must be gathered and handed over to ensure harmonious continuation of both activities.** **<u>Fauna</u>** Workers should refrain from killing species (big or small and all types) that may be found on and around the site, including rock outcrops' species. Workers should refrain from disturbing, killing or stealing locals' animals (livestock). Project personnel are not allowed to kill or in any way disturb livestock and local wildlife. 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.	No complaints of illegal hunting / poaching No complaints of livestock theft, snaring or killing of livestock by the project personnel.			

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources	Timeline
		Environmental awareness on the importance of biodiversity preservation should be provided to the workers.				
Illegal hunting	Illegal hunting of wildlife	**Most farms in the area have wild animals, therefore illegal hunting (poaching) and disturbance of wildlife on the farms is strictly prohibited for all exploration personnel, project related visitors, auditors, and inspectors alike.** Site personnel should refrain from killing/poaching or snaring or intentionally disturbing local animals that may be found on and around the exploration sites.	Incident reports of illegal hunting of wildlife by the crew.	SHE Officer	Complaints logbook Farm Owner / Manager MEFT: Wildlife Division Police: Anti-Poaching Unit	During site set up, and throughout exploration phase
Aesthetics of the area	Visual impact	Implementation of continuous to allow progressive restoration around the margins of the explored site areas. Sampled areas must be reinstated immediately. Implementation of other suitable best international practice visual mitigation measures after exploration.	No further major contribution to the visual impact in the area. No complaints from the locals regarding major eyesore due to unmanaged site restoration	Exploration Manager	Complaints logbook Record of progressive backfilling done to reduce landscape contrast	Throughout the exploration phase
Health and safety	General health and safety associated with project activities	The Labour Act's Health and Safety Regulations should be complied with. 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.	Comprehensive health and safety plan for all exploration activities compiled.	Exploration Manager	Time, printing resources.	Prior to site setup activities and throughout the phases

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources	Timeline
		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. Heavy vehicle, equipment and fuel storage site should be properly secured, and appropriate warning signage placed where visible. Drilled boreholes 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. Ensure that after completion of exploration holes, drill cuttings are put back into the hole and the holes filled and levelled. An emergency preparedness plan should be compiled, and all personnel appropriately trained. 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. Workers should not be allowed on site if under the influence of alcohol. 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				

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources	Timeline
		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 wear reflective clothing to allow clear visibility by the anti-poaching unit, and must wear their identification tags at all times.				
Health and safety	Accidental fire outbreak	**Portable fire extinguishers should be provided on site.** No open fires to be created by exploration personnel. 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.	No wildfires recorded (due to presence of workers)	SHE Officer	Fire extinguishers (1 per vehicle) and 1 per working site	Throughout exploration phase

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources	Timeline
		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. Potential flammable areas and structures such as fuel storage tanks should be marked as such with clearly visible signage.				
Archaeology and heritage	Accidental disturbance and destruction of archaeological or heritage objects and sites	Although no items of sites of archaeological and heritage importance are known in the EPL area so far, caution must be exercised when clearing areas to prepare for drilling, creating access roads or setting up camps, as well as when employing subsurface techniques. **However, in an unlikely event of a possible chance find, reporting must be done as per the procedures outlined in the National Heritage Council's Chance Find Procedure (please refer to Appendix 1 of this document)**	Preservation of all artefacts that are discovered around project area	SHE Officer Operator Foreman Superintended Archaeologist	Salvage equipment Flag tapes GPS (site marking)	As and when required, i.e. prior to site set up, during exploration and after

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources	Timeline
		The worksite manager should familiarise themselves with the National Heritage Council's Chance Find Procedure and if uncertain about the procedure should receive training by a suitably qualified archaeologist with respect to the identification of archaeological/heritage remains and the procedures to follow in the event that such remains are discovered throughout the project activities' duration. A Professional Archaeologist must be on site to monitor during clearing on the affected areas.				
Local Services infrastructure	Damage to buried water pipelines and or cables	The Proponent's Public Relation Officer (PRO) should consult with the farmers to help in locating potential buried water pipelines or power cables on their properties (farms) to avoid damages. If possible, heavy trucks should avoid driving over farm areas that are known to have pipelines or any related infrastructure buried. The project personnel should be informed not to leave the farms' gates open, but close or lock them as instructed by the farm owners. Project equipment and machinery should not be left leaning on the farm fences (using the fences as support). Agreement and continued engagement with landowners / farm owners on use and maintenance of farm infrastructure (roads, fences, gates, boreholes, etc.) should be implemented and maintained.	Complaints from farm owners or occupiers of land about damaged water pipes and fences or gates left open.	PRO SHE Officer	Complaints logbook Gate locked Record of known areas with buried services infrastructure	Pre- exploration phase and then throughout

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources	Timeline
Littering and waste management (general waste and sanitation)	Environmental Pollution	Project workers should be sensitized to dispose of waste in a responsible manner and not to litter. After each daily works, there should not be waste left scattered on site, but rather be disposed of in allocated site waste containers. No waste may be buried or burned on site or anywhere else throughout the project lifecycle. All domestic and general waste produced daily should be contained until such that time it will be transported to designated waste sites on a weekly basis. The sites should be equipped with separate waste bins for hazardous and general waste/domestic. 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. A penalty system for irresponsible disposal of waste on site and anywhere in the area should be implemented.	No visible litter around the project area	SHE Officer	Waste storage containers	Throughout exploration phases.

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources	Timeline
	Wastewater generated by exploration workers living on-site.	Provision of toilet facilities for exploration workers (mobile toilets). Emptying of mobile toilets according to the manufacturer's specifications. Treating latrine waste to render non-polluting. 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.	Adequate toilet facilities on site.	SHE Officer	Mobile toilets or excavator (pit creation), waste treatment agents/chemicals	At site setup and throughout exploration phase
Vehicular Traffic	Traffic safety	The transportation of exploration materials, equipment and machinery should be limited to once or twice a week only, but not every day. The heavy truck loads should comply with the maximum allowed limit while transporting materials and equipment/machinery on the public and access roads. The site access road(s) should be upgraded to an unacceptable 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. Drivers of all project phases' vehicles should be in possession of valid and appropriate driving licenses.	No complaints from members of the public regarding vehicular traffic issues related to the project All personnel operating the project vehicles and machinery are appropriately licensed and possession of valid driving licenses. Demarcated areas for parking, offloading, and loading zones are on sites	SHE Officer	None	Throughout exploration phase Site access permit (s) to be applied for and obtained prior to commencement of exploration works

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources	Timeline
		Vehicle drivers should adhere to the road safety rules. Drivers should drive slowly (40km/hour or less), and on the lookout for livestock and wildlife. Ensure that the site access roads are well upgraded and in good condition to cater for vehicles travelling to and from site throughout the project's life cycle Project vehicles should be in a road worthy condition and serviced regularly to avoid accidents due to mechanical faults of vehicles. Vehicle drivers should only make use of designated site access roads provided. Vehicles drivers should not be allowed to operate vehicles while under the influence of alcohol. Sufficient parking area for all project vehicles should be provided for and clearly demarcated son sites. The Proponent should make provision for safe materials and equipment offloading and loading areas on sites. No heavy trucks or project related vehicles should be parked outside the project site boundary or demarcated areas for such purpose. Truck movements, frequency, times, and routes should be carefully planned and scheduled – 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.	Ste access road permits obtained, and requirements fulfilled			

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources	Timeline
		Site access roads 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				
Air Quality	Dust generation	Drilling equipment should be regularly maintained to ensure efficiency and reduce dust generation. Dust masks, eye protective glasses and other respiratory personal protective equipment PPE) accessories should be provided to the workers on site, specifically the ones exposed to dusty site area and activities. The impact mitigation measures should be covered in the relevant farm access agreement as required by law on commercial farms. This should also be considered for resettled 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. On extremely windy days, a reasonable amounts of water should be used to supress 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 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.	No complaints from the public about vehicle emissions and dust generation. Visible efforts to curb dust	SHE Officer	Complaints logbook Vehicle and machinery mechanic	Throughout exploration phase

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources	Timeline
Noise	Nuisance	The transportation of exploration materials, equipment and machinery should be limited to once or twice a week only, but not every day. Noise from project vehicles and equipment on site should be reduced to acceptable levels. The exploration 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). 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. When operating the blasting and drilling machinery onsite, workers should be equipped with personal protective equipment (PPE) such as earplugs to reduce noise exposure. **Targeted exploration sites that may be found to be within less than 1 km from the residence (farmhouses) should be avoided at all costs. This is done to preserve some tranquillity for the residents. If cannot be avoided, the residents must be informed two weeks in advance about the planned activities in their vicinity.** If the Proponent does not already have a drilling expert or the experience, an experienced blasting contractor should be hired to carry out exploration activities in a professional manner such that noise is kept at minimum because of a very good ''know-how'' with the utilized drilling machinery and equipment	Complaints from residents about excessive noise.	SHE Officer	Complaints logbook	At site set up and throughout exploration phase

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources	Timeline
		Notice should be given at least two (2) weeks in advance to indicate the flying times for geophysical surveys.				
Social nuisance	Job seeking and crashes due to differing norms, culture, and values	Priority of employment should be given to 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. 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. 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. 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	Correct and fair recruitment procedures are followed and practised. More local people are employed for both skilled, semi and unskilled works Out-of-area people only employed for specialized skills that are not found in the project area. No complaints of unfair recruitment procedures. Grievance and response records	Exploration Manager PRO	Records of employees and their places of origins in relation to the site area	Pre-exploration In special cases, during the project phases, depending on the project needs
	Potential increase of prevalence of HIV and AIDS, as well as other sexually transmitted	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.	No new infections recorded linked to exploration workers	SHE Officer	None	During site setup and throughout exploration phase

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources	Timeline
	diseases (STIs) prevalence	Provision of condoms and sex education through distribution of pamphlets. These pamphlets can be obtained from local health facilities.				
	Private and Public Property intrusion and Disturbance or Damage	Project workers should be educated 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 Project workers should be advised to respect the community and local's private properties, values, and norms. No worker should be allowed to wander in people's private yards or fences without permission. Site workers are not allowed to kill or in any way disturb local livestock. No worker should be allowed to, without permission cut down or damage trees belonging either the farm owner, the neighbouring farms or in the already scarce community vegetation.	Harmonious interaction between the project personnel and property owners. No complaints of property damaged, or intrusion caused by project personnel	Exploration Manager PRO	Complaints logbook or records of grievances and how they were addressed	Throughout the exploration phase
REHABILITATION AND DECOMMISSIONING PHASE						
Rehabilitation	Disturbance and damaging of land site land	All waste generated and store on site during exploration activities should be disposed of at the respective nearest solid waste management sites.	Capped boreholes and backfilled pits	Proponent	Record of boreholes drilled, and pits excavated (if any)	Throughout the exploration phase

Aspect	Impact	Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources	Timeline
		The stockpiled topsoil should be levelled during exploration activities. Any temporary work camps setup should be dismantled, and the area rehabilitated as far as practicable, to their original state. Explored areas on worksites should be progressively rehabilitated by and backfilling. Provision of both financial and technical resources for progressive rehabilitation and post-exploration activities should be made. **Functional water boreholes and solar panels can be donated to the local farmers.**	No sign of waste or littering seen on site and around site areas No stockpiled topsoil (topsoil is levelled after completion of each work) Campsite dismantled and materials taken away from site Visible signs of stockpiled topsoil Annual update of finances reserved for decommissioning		Waste containers on sites Photo records of backfilled sites Records of campsite Records of finances set aside for decommissioning activities	

Table 5-2: Monitoring requirements for impact mitigation measures (modified after Resilient Environmental Solutions, 2019)

Impact	Parameter to be Monitored	Monitoring Objective	Key Performance Indicator (KPI)	Methods of Monitoring	Frequency	Responsible Party	Reporting structure	Threshold	Action if threshold is exceeded
Water and soil pollution									
Soil pollution by hydrocarbon (fuel and lubricant spills)	Complaints from farmers or occupiers of land within the project sites	To prevent contamination of site soils	No complaints from farmers about visible oil spills	Inspection of complaints logbooks	Weekly	SHE officer	SHE Officer> Exploration Manager	A logged complaint	Further consultations with the farm/landowners

Impact	Parameter to be Monitored	Monitoring Objective	Key Performance Indicator (KPI)	Methods of Monitoring	Frequency	Responsible Party	Reporting structure	Threshold	Action if threshold is exceeded
Wastewater generated by exploration workers living on-site.	Open defecation and urination.	To prevent environmental pollution	Adequate toilet facilities on site. Complaints from the public about open defecation and urination.	Visual observation. Inspection of complaints logbook.	Weekly	SHE Officer	SHE Officer> Exploration Manager	A logged complaint	Clean-up of affected areas.
Soils									
Loss of topsoil	Increased loss of soil	To prevent loss of topsoil	No proliferation of informal vehicle tracks. No new erosion gullies	Visual observation	Weekly	SHE Officer	SHE Officer> Exploration Manager	Proliferation of new vehicle tracks Formation of new gullies in work areas	Rehabilitation of affected explored areas
Air quality									
Increase in dust generation, which might negatively affect occupational and residential respiratory health.	Complaints from public about increased in dust generation.	To reduce public complaints and prevent negative changes in air quality due to exploration activities	No complaints from the public about increased dust generation.	Inspection of complaints logbook.	Weekly	SHE Officer	SHE Officer> Exploration Manager	A logged complaint	Dust suppression around working areas to reduce fugitive dust
Hydrocarbon emissions from vehicles	Complaints from the public about increased vehicles fumes	Same as above.	No complaints from the public about increased vehicle emissions	Inspection of complaints logbook.	Weekly	SHE Officer	SHE Officer> Exploration Manager	A logged complaint	Servicing of vehicles and machinery by a certified service provider

Impact	Parameter to be Monitored	Monitoring Objective	Key Performance Indicator (KPI)	Methods of Monitoring	Frequency	Responsible Party	Reporting structure	Threshold	Action if threshold is exceeded
Poaching (Illegal hunting)									
Illegal hunting of wildlife	Reported poaching incidents by projects team	To prevent illegal hunting of wildlife	Incidents reports of illegal hunting of wildlife by exploration workers.	Consultation with the local Police Service for reported incidents of poaching.	Weekly	SHE Officer	SHE Officer> Exploration Manager> local police service	An incidents report logged with the local Police Service	Appropriate action will be decided by the local Police Service
Habitat loss (Biodiversity)									
Localised loss of habitat and vegetation	Loss of habitat	To prevent loss of habitat outside areas of interest	No disturbance to unmarked areas within the project area	Visual observation	Weekly	SHE Officer	SHE Officer> Exploration Manager	Vegetation clearance outside of marked areas.	Rehabilitation of affected areas to the satisfaction of the SHE Officer
Health and safety									
No health and safety plan for exploration activities.	Compiled health and safety plan for exploration activities.	To prevent health and safety impacts	No significant health and safety incidents (i.e. serious injuries or loss of life)	Visual observation Inspection of complaints logbooks	Daily/ weekly	SHE Officer and Exploration Manager	SHE Officer> Exploration Manager	Health and safety incident	Remedy the consequences
Potential increase in outbreak of wildfires due to project activities	Occurrence of wildfires	To prevent environment damage caused by wildfires	No wildfires recorded (due to presence of exploration workers)	Visual observation	Daily	SHE Officer	SHE Officer> Exploration Manager > local police service	Outbreak of wildfires due to the exploration workers	Rehabilitation of affected areas

Impact	Parameter to be Monitored	Monitoring Objective	Key Performance Indicator (KPI)	Methods of Monitoring	Frequency	Responsible Party	Reporting structure	Threshold	Action if threshold is exceeded
Archaeology and cultural heritage									
Potential disturbance of archaeological and cultural heritage resources	Presence or unearthing of archaeological or cultural heritage resources	To prevent destruction of artefacts and sites	Preservation of all artefacts and sites that are discovered within the site boundary or around the project site area	Inspection of records of findings	Daily	SHE Officer Operator	Operator>Foreman>Superintended>SHE Officer>Project Archaeologist>National Heritage Council (NHC)	Unearthing of archaeological or cultural heritage resources	Cease all activities on site and wait for NHC to inspect site and give further instructions / actions
Employment creation									
Creation of employment	Creation of employment opportunities	To ensure that locals benefit from the project	Number of locals employed during exploration activities	Inspection of employment records	Monthly	Exploration Manager	Project Manager or Proponent	Number of those employed	None
Noise									
Potential increase in noise	Above ambient noise levels.	To ensure that generated noise does not disturb residents.	Complaints from residents about noise generated.	Inspection of complaints logbook	Weekly	SHE Officer	SHE Officer> Exploration Manager	A logged complaint about above normal noise levels	Revision of site activities
Vehicular Traffic									
Increase in traffic density on declared Roads	Complaints from the public about	To ensure continued ease of access	No complaints from the public about increase off traffic due	Inspection of logbooks	Weekly	SHE Officer	SHE Officer> Exploration Manager >	A logged complaint about traffic	Find alternative access roads for the team.

Impact	Parameter to be Monitored	Monitoring Objective	Key Performance Indicator (KPI)	Methods of Monitoring	Frequency	Responsible Party	Reporting structure	Threshold	Action if threshold is exceeded
Authority (RA) roads or damage to these.	increase in traffic on RA roads. Complaints about damage to RA roads caused by movement of project vehicles and machinery.	to RA roads by residents	to exploration activities				Roads Authority	increase or damage to RA roads	Rehabilitation of affected roads
HIV and AIDS									
Potential increase in HIV and AIDS prevalence.	New HIV or STIs infections	To prevent new infections in the area	No new HIV or STIs infections recorded	Liaison with local health facilities	Monthly	SHE Officer	SHE Officer> Exploration Manager > Ministry of Health and Social Services	Recorded new HIV or STIs linked to the exploration workers	Continued sex education and provision of condoms
Social nuisance: Property invasion or disturbance and damage									
Potential intrusion or damage/destruction of private or public properties	Unauthorized intrusion and or damage to properties	To prevent crashes and tensions between the Proponent and the land/property owners	No complaints of property damage or intruding by project personnel	Liaison with property owners or occupiers of land	Monthly	PRO	Exploration Manager (or Proponent) >PRO>Landowners/Occupiers of land	Arising new complaints	PRO to warn the personnel on respecting people's properties. If persists then Code of Conduct to be implemented
Environmental Pollution (Littering)									
Environmental pollution from solid waste	Scattered litter	To prevent littering of the	No visible litter around the project area	Visual observation	Daily	SHE Officer	SHE Officer>	Visible littering around	Clean-up of the affected areas and ensuring exploration

Impact	Parameter to be Monitored	Monitoring Objective	Key Performance Indicator (KPI)	Methods of Monitoring	Frequency	Responsible Party	Reporting structure	Threshold	Action if threshold is exceeded
during exploration activities.		general project area					Exploration Manager	project site	workers utilise waste containers provided.
Visual									
Visual impact owing to the project's exploration activities	Contrasting landscape (eyesore to travellers on the B2 road) and locals	To prevent and or reduce the appearance of contrasting land scars	Reduction of and insignificant (minor) contrasting landscape in the project site areas	Visual observation	Weekly	SHE Officer	SHE Officer> Exploration Manager	Major and very visible contrasting land scars on the site areas	Effective implementation of provided measures and continual improvements using other suitable visual mitigation measures. Ensuring that exploration works are only carried out on the targeted sites/spots of the EPL.
Site Rehabilitation									
Soil and land disturbance because of exploration activities.	Abandoned and stockpiled topsoil as well as very disturbed land surface	To prevent major soil and land damage by project activities	No major soil and land disturbance	Visual observation	Daily	SHE Officer	SHE Officer> Exploration Manager	Visible soil and land disturbance	Effective progressive backfilling of topsoil and rocks

6 CONCLUSIONS AND RECOMMENDATIONS

It is recommended that an Environmental Clearance Certificate be issued for the proposed exploration activities 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 2 of this document (EMP). These include permits and licenses for land/farm access agreements to explore and ensuring compliance with these specific legal requirements.
- The management action plans in the EMP should be implemented and monitoring conducted as provided in **Table 5-1** and Table **5-2**, respectively as well as the implementation of Archaeological Resources management measures indicated in **Appendix 1**.
- 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 this 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 herein.

In conclusion, the effective implementation of the recommended management actions (mitigation measures) will see the significance reduction in impacts' significance (that cannot be avoided) from medium to low. It is therefore recommended that the Proponent and their contractors/employees effectively implement the recommended management plan actions (mitigation measures). Furthermore, to maintain low significance, the implementation of measures will need to be continuously monitored by the Proponent (or the SHE Officer). Monitoring will not only be carried out to maintain the low rating of impacts' significance but to also ensure that all potential impacts identified in this study and other impacts that might arise during project implementation are properly identified in time and addressed.

APPENDIX 1: CHANCE FINDS PROCEDURE (AFTER KINAHAN, 2020)

Areas of proposed development activity are subject to heritage survey and assessment at the planning stage. These surveys are based on surface indications alone, and it is therefore possible that sites or items of heritage significance will be found during development work. The procedure set out here covers the reporting and management of such finds.

Scope: The "*chance finds*" procedure covers the actions to be taken from the discovery of a heritage site or item to its investigation and assessment by a trained archaeologist or other appropriately qualified person.

Compliance: The "chance finds" procedure is intended to ensure compliance with relevant provisions of the National Heritage Act (27 of 2004), especially Section 55 (4): "*a person who discovers any archaeological …. object ……must as soon as practicable report the discovery to the Council*". The procedure of reporting set out below must be observed so that heritage remains reported to the NHC are correctly identified in the field.

Responsibility:

Operator:	To exercise due caution if archaeological remains are found
Foreman:	To secure site and advise management timeously
Superintendent	To determine safe working boundary and request inspection
Archaeologist	To inspect, identify, advise management, and recover remains

Procedure:

Action by person identifying archaeological or heritage material

a) If operating machinery or equipment stop work

b) Identify the site with flag tape

c) Determine GPS position if possible

d) Report findings to foreman

Action by foreman

a) Report findings, site location and actions taken to superintendent

b) Cease any works in immediate vicinity

Action by superintendent

a) Visit site and determine whether work can proceed without damage to findings

b) Determine and mark exclusion boundary

c) Site location and details to be added to project GIS for field confirmation by archaeologist

Action by Archaeologist

a) Inspect site and confirm addition to project GIS

b) Advise NHC and request written permission to remove findings from work area

c) Recovery, packaging and labelling of findings for transfer to National Museum

In the event of discovering human remains

a) Actions as above

b) Field inspection by archaeologist to confirm that remains are human

c) Advise and liaise with NHC and Police

d) Recovery of remains and removal to National Museum or National Forensic Laboratory, as directed.