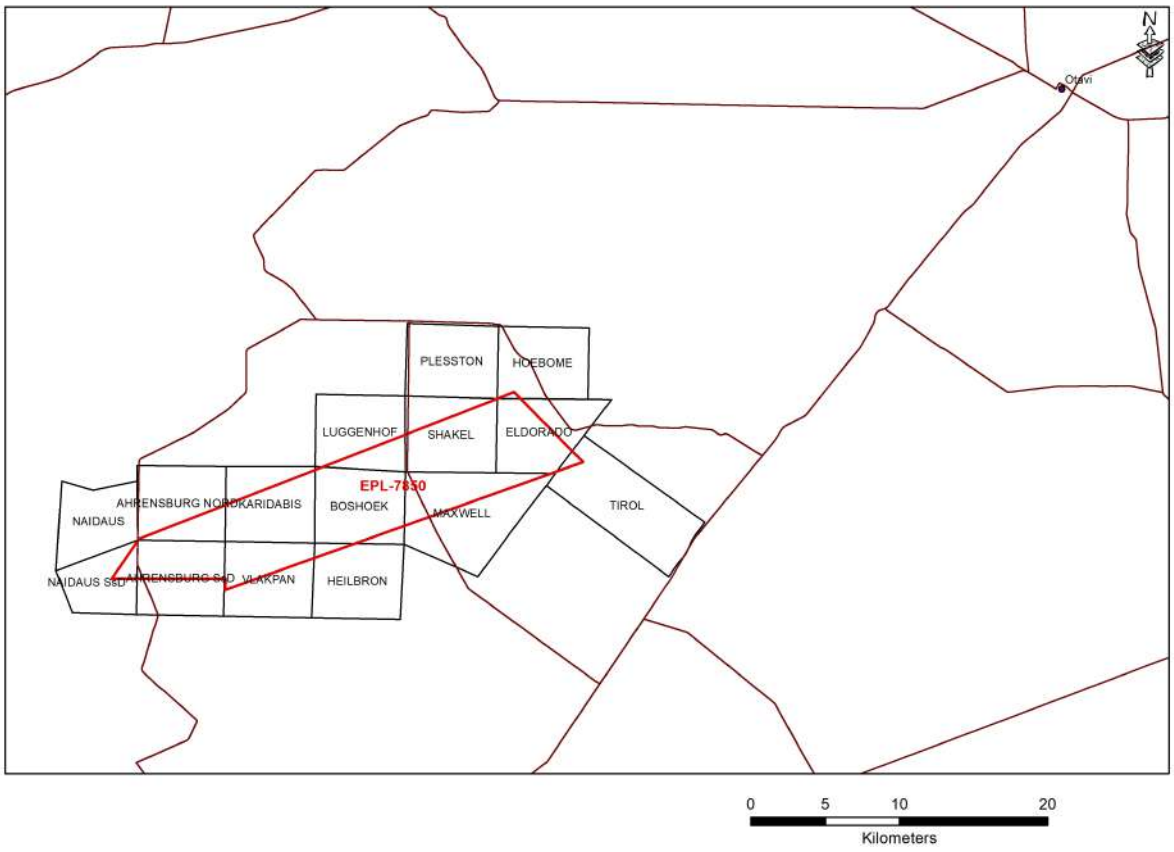
RED-DUNE CONSULTING CC

APP: 231004002223

Environmental Impact Assessment for the Proposed Exploration Activities of Base and Rare Metals, Dimension Stone, Industrial Minerals, Precious Metal On Exclusive Prospecting License 7850 at Otjiwarongo District, Otjozondjupa Region



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DOCUMENT INFORMATION

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APPLICATION NO:	**APP: 231004002223**
PROJECT TITLE	Environmental Impact Assessment for the Proposed Exploration Activities of Base and Rare Metals, Dimension Stone, Industrial Minerals, Precious Metal On Exclusive Prospecting License 7850
CLIENT	Mr. Linus Nambili Frederick
PROJECT CONSULTANT	Mr. Ipeinge Mundjulu
LOCATION	Otavi and Otjiwarongo, Otjozondjupa Region
DATE	06 January 2024

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ACRONYMS

AIDS Acquired Immune Deficiency Syndrome

DEA Department of Environmental Affairs

ECC Environmental Clearance Certificate

EIA Environmental Impact Assessment

EMA Environmental Management Act (No. 7 of 2007)

EMP Environmental Management Plan

EPL Exploration Prospecting Licenses

GDP Gross Domestic Product

HIA Heritage Impact Assessment

HIV Human Immune Virus

MEFT Ministry of Environment Forestry and Tourism

OML Otavi Mountain Range

RC Reverse Circulation

RDC Red-Dune Consulting

EXECUTIVE SUMMARY

Proponent

Mr. Linus Nambili Frederick , owns the Exploration Prospecting License 7850, located about 70 kilometres north of Otjiwarongo and about 40km north of Otavi in Otjozondjupa Region. The proponents intents to carry out exploration activities of Base and Rare Metals, Industrial and Precious Metals on the EPL.

EPL Description

The EPL is located at coordinates -19.893447°S, 16.895574°E). It measures 15729.44 hectares (ha) and cover farms Ahrensburg Sued 86, Ahrensburg Nord 79, Vlakpan 85,Karidabis 80,Heilbronn 84, Boshoek 81, Maxwell 82, Juggenhof 76, Shakel 75, Eldorado 74, Tirol 560, Hoebome 72, Naidaus, South 382.

Description of the surrounding environment

The EPL covers portions of commercial farms where land use is mainly agriculture, of which cattle farming is prominent. The areas has four active mining license, about 15km east of the EPL is the famous B2GOLD mine.

Proposed exploration activities

The proposed exploration activities will comprise of non-invasive methods such as geological field mapping and geophysical ground mapping to generate target point where geochemical soil sampling will take place. Generated targets will be sampled using traditional methods of shallow pitting and trenching, while deeper targets would be sampled through Reverse Circulation drilling.

The line layout is structured to avoid cutting down protected and mature trees. All drilled holes shall be covered completely after sampling, unless otherwise the farm owners indicate interest in the drilled hole (i.e. water borehole), where a casing may be left. Energy supply shall be in the form of gas for cooking purposes, solar for lighting and a generator for heavy duty such as welding. None of these activities pose a significant impact on the environment. The safety and

health aspects associated with drilling such as lung diseases, fatalities from handling of equipment, exposure of insect bites and communicable diseases are well addressed in the environmental management plan.

Stakeholder Consultations

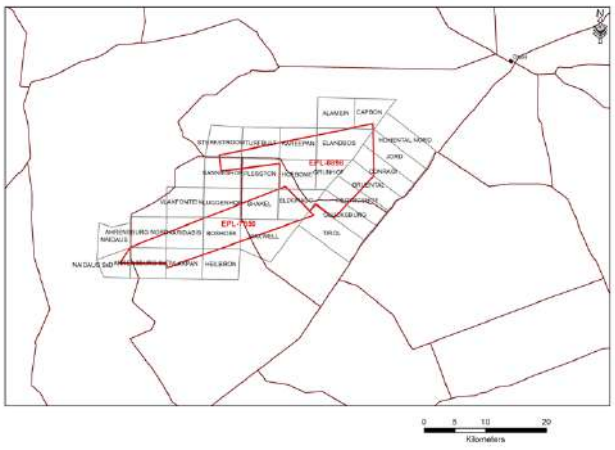
Public consultation was undertaken as provided for by the EIA regulation. A database for farm owners was created, a WhatsApp and an email group was created where the background information document was circulated. The project was advertised in the New Era and Confidante newspapers on 15th and 16th and 21st and 23rd November and a public meeting was held on 24th November 2023 at Khorab Lodge in Otavi.

Study limitation and Recommendations

This study was conducted with high degree of confidence and no impacts were identified that would necessitate a no-go option. It is therefore recommended to the approving authority to approve the project and issue it with the Environmental Clearance Certificate.

Furthermore, should the exploration yield into a feasibility for a full mining operation, it is recommended that a comprehensive study with various specialist studies such as Hydrogeology, Ecology, Cultural, Heritage and Archaeology should be conducted.

Please Note, a similar application for the ECC is done for **EPL 8898,** which are back-to-back with **EPL 7850** as shown in the figure on the right.



1 INTRODUCTION

1.1 Proponent

Mr. Linus Nambili Frederick, owns the Exploration Prospecting License 7850, situated between the areas of Otavi and Otjiwarongo in Otjozondjupa Region. Mr. Linus intent to carry out exploration activities of Base and Rare Metals, Dimension Stone, Industrial Minerals, Precious Metal on the EPL.

1.2 Regulatory requirements

Section 27 (2) of the Environmental Management Act (Act No. 7 of 2007) hereinafter referred to as 'EMA', and annexure of Environmental Impact Assessment Regulation (Government Notice No. 30 of 2012), listed activities that may not be undertaken without an Environmental Clearance Certificate as shown in **Table 1** below.

Table 1. Identified listed activities concerning the proposed project

Activity	**Description of the Activity**	**Applicability**
3.1 The construction of facilities for any process or activities which requires a license, right or other form of authorization, and the renewal of a license, right or other form of authorization, in terms of the Minerals (Prospecting and Mining Act), 1992.	The projects shall include the prospecting of Mineral	The project obtained the EPL
3.2 Other forms of mining or extraction of any natural resources whether regulated by law or not.	The project shall involve the extraction of mineral resource	Mining activities shall involve, drilling and digging to extract natural resource.

3.3 Resource extraction, manipulation, conservation and related activities.	The project shall involve the extraction and manipulation of mineral resources	The project shall extract resource sample for manipulations / analysis.

It is against the above-mentioned background that the proponent appointed Red-Dune Consulting CC (RDC) to carry out a social and environmental impact assessment for the proposed exploration activities on the EPL.

1.3 The Need and Desirability of the Project

Developing countries, especially Africans states economies largely depends on mineral extraction industries. These extraction industries are important in contributing to countries' economies and provide much needed employment. Mining processes are preceded by exploration activities, which aims to map the mineralization of the minerals in order to establish a mining area. The discovery of economical deposit from exploration activities yield into mining activities which is the main driver for the Namibia Economy. Hence this project is important to the socio-economic needs of the country.

1.4 Terms of Reference

The Terms of Reference (TORs) for this Environmental Impact Assessment (EIA) is in accordance with the EMA and its EIA Regulation Section 9 (a-b). It considers other relevant local, national and international laws. These guidelines are aimed to focus on issues of greater environmental concerns and to develop mitigation measures for effective environmental management. Eventually, this EIA is aimed at obtaining the ECC for the project and to ensure environmental sustainability. The TORs of this project includes, but not limited to the following;

- Provide a comprehensive description of the proposed Project;

- Identify relevant legislation and guidelines for the project;
- Identify potential environmental (physical, biological and social) conditions of the project location and conduct risk assessment;
- Inform Interested and Affected Parties (I&APs) and relevant authorities about the proposed project to enable their participation and contribution;
- Develop an Environmental Management (EMP) that would be a legal guideline for the environmental protection by the project

1.5 Scope of EIA

The scope of this project is guided by the EIA Regulations 2012, which follows the process as shown in **Figure 1**. The scope aims at identifying possible impacts, assessing the impact and formulate the optimum, practical mitigation measure to minimize the impacts.

Red-Dune (RD) believes that the developed Environmental Management Plan (EMP) provides practical mitigation measure which shall ensure environmental sustainability. Further, RD believes that, the information provided is adequate and sufficient to enable the Environmental Commissioner (EC) to make an informed decision and issue the Environmental Clearance Certificate for the project.

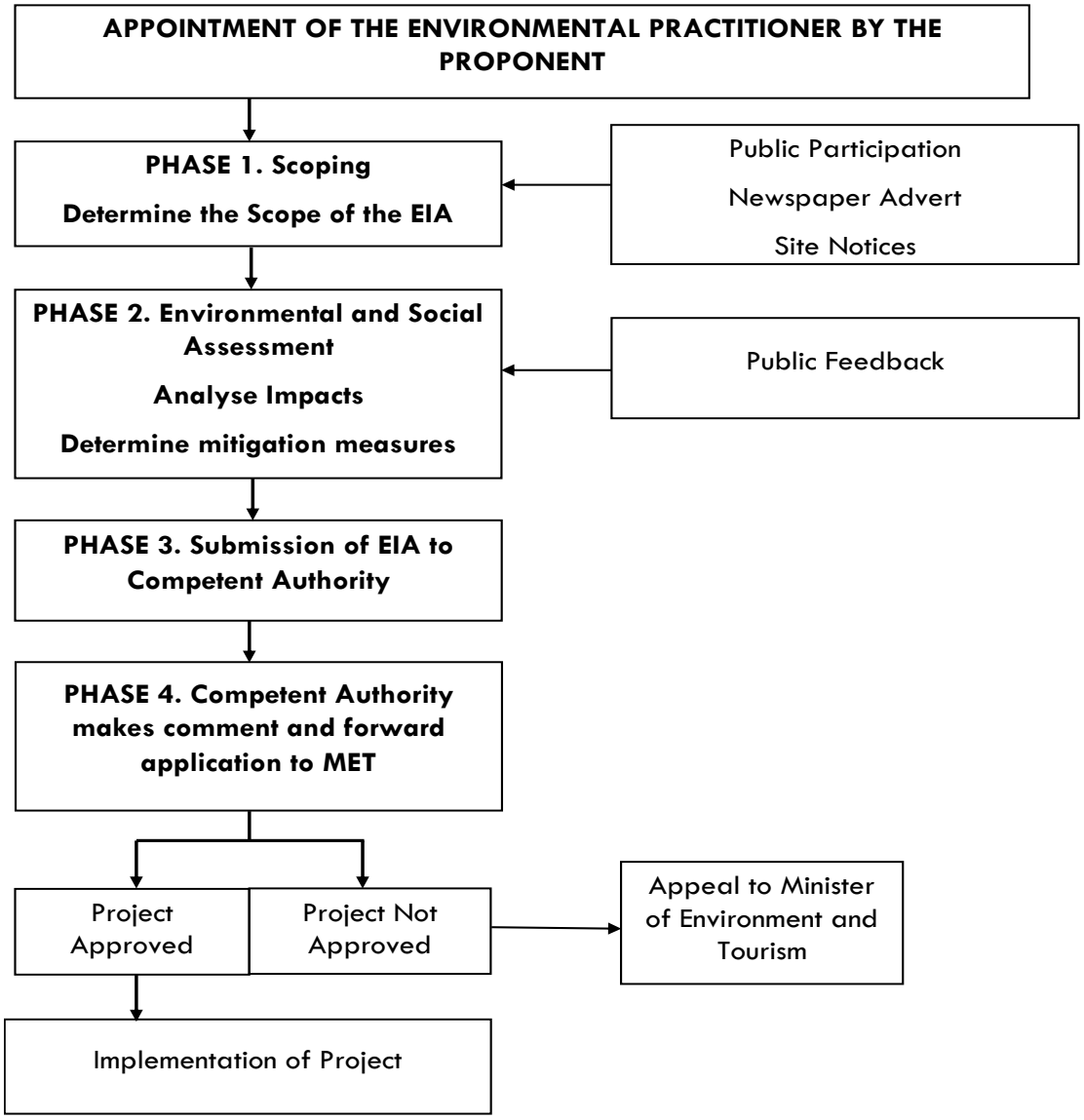


Figure 1.The EIA process in Namibia

2 PROJECT DESCRIPTION

2.1 Location

The EPL 7850 is located at coordinates -19.893447°S, 16.895574°E), **Figure 1, Table 2.** It measures 15729.44 hectares (ha) and cover farms Ahrensburg Sued 86, Ahrensburg Nord 79, Vlakpan 85,Karidabis 80,Heilbronn 84, Boshoek 81, Maxwell 82, Juggenhof 76, Shakel 75, Eldorado 74, Tirol 560, Hoebome 72, Naidaus, South 382.

Table 2. EPL 7850 Coordinates

Point	Latitude	Longitude
1	-19.830833°S	16.991961°E
2	-19.872778°S	17.036961°E
3	-19.953056°S	16.807222°E
4	-19.947017°S	16.748457°E
5	-19.922944°S	16.751406°E

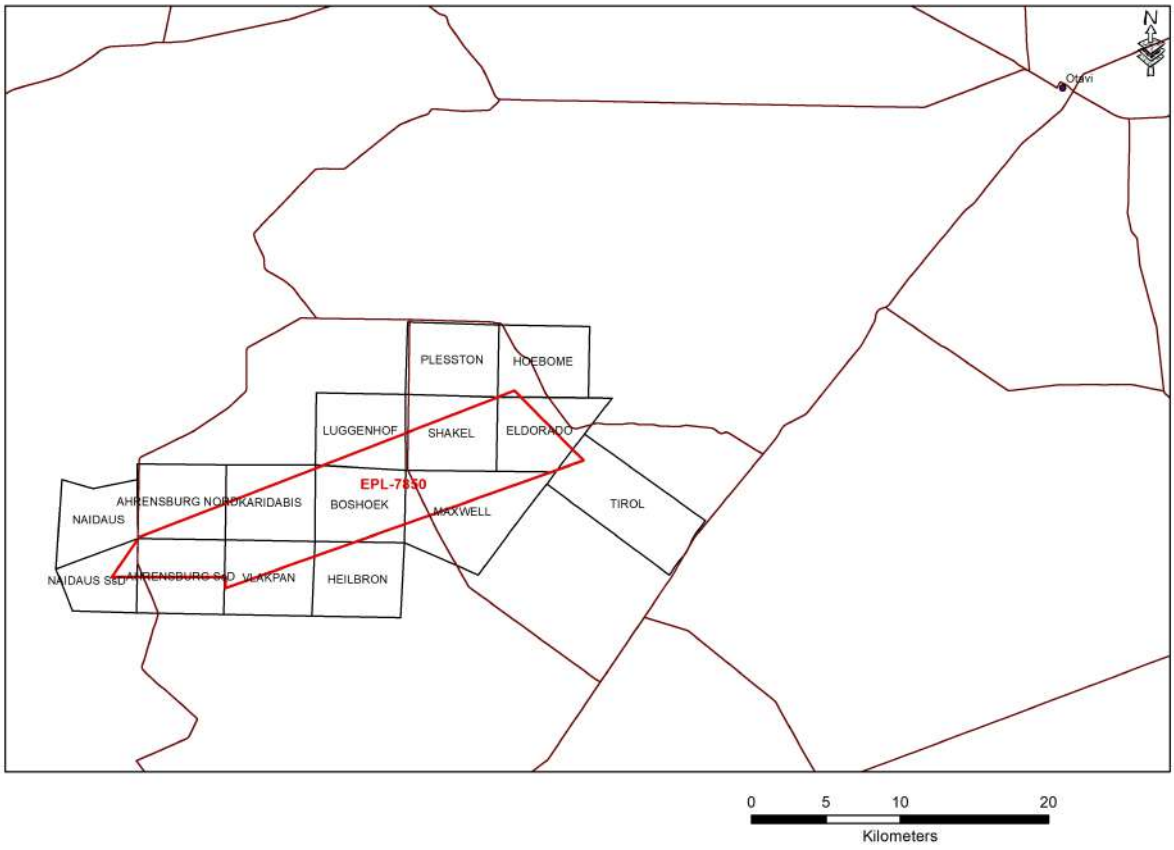


Figure 2. EPL 7850

2.2 Surrounding Area Descriptions

The EPL covers portions of commercial farms where land use is mainly agriculture, of which cattle farming is prominent. The areas has four active mining licenses and about 15km east of the EPL is the famous **B2GOLD** mine (see **Figure 3** below).

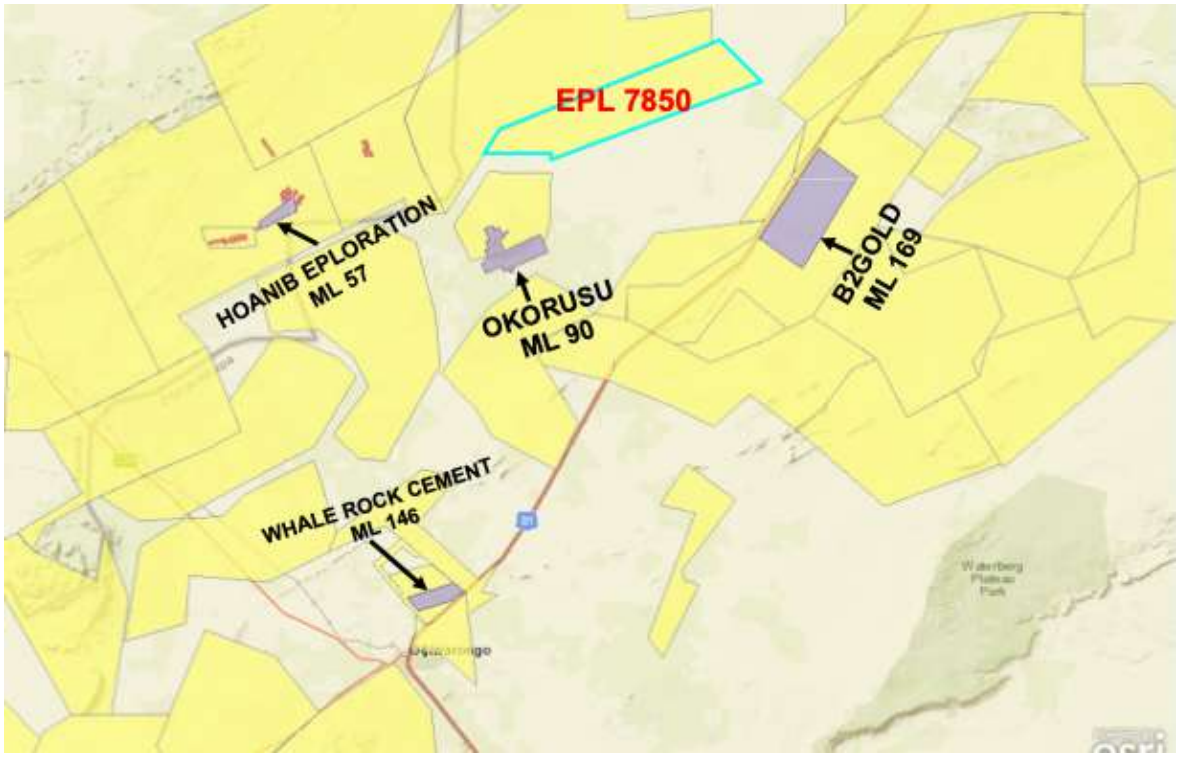


Figure 3. Locality of EPL 7850

2.3 Proposed Exploration activities

The proposed exploration will adopt the following various prospecting methods

- Reconnaissance field mapping
- Geochemical soil sampling and target generation
- Geophysical ground surveys (magnetics, electromagnetics, gravity)
- Diamond/RC Drilling of geophysical target

2.3.1 Phase 1. Non-Invasive Exploration

The initial phase of mineral prospecting and exploration involves non-invasive work. These activities do not cause physical damage to the environment. These activities include geological studies and field mapping where analysis of historical data, geological maps and their interpretations take place. Analysis of these data would generate geophysical targets where

evasive exploration would take place. The non-invasive exploration activities are explained below;

Geological studies and field mapping, during this stage, various geological data for the area will be collected from different sources to analyse and study available information of the area. Information are derived from aerial photo. These geological photos are studied to generate target point where geochemical soil sampling are to be taken. This stage is non-invasive and does not have any significant impact on the environment. Existing access road would be used and hand tools would mainly be used for samples collections.

Soil surveys Soil survey is the process used to classify soil types and other soil properties in target area which is used for geo-encoding. The collection of information of the substrata, by air or ground, through sensors such as radar, magnetic and electromagnetic to detect any mineralization in the area. This is a non-evasive process that does not have impact on the environment. Soil sampling traverses to be conducted on foot within the farming areas shall be collected from soil sampling pits, which would be around 30x30x30cm (hand-held shovel width and depth) and are to be backfilled immediately after sampling.

Geophysical surveys, Geophysical ground surveys uses various method to gather geological information such as magnetic and electromagnetics. Magnetic surveying measure local magnetic field characteristic of the generated targets from geological mapping. This activity is used to detect minerals that respond to magnetic field. It provides information of a sub-surface area without physically opening the ground and is able to detect metal ore in the ground. The activity can be done from air and on ground. On ground, a Magnetometer is carried by a person on the surveyed areas to collect samples. While in aerial magnetic data was collected using a helicopter / fixed wind airplane where the Magnetometer is mounted especially on difficult terrain and on large terrains. This activity does not pose significant impact to the environment.

2.3.2 Phase 2. Evasive Exploration

The second phase of exploration includes sampling for geochemical samples from targets sites. During this phase collection of geochemical samples from hole of less than 1m and drilling shall take place. The target sites maybe un-accessible with existing roads, hence new access road shall be established. Normally, farm roads are meant for light vehicles, exploration vehicles have the potential to damage the farm access roads. Hence proper road maintenance must be implemented to ensure that the roads are left on good state.

Generally, many farms are encroached by bushes of Acacia Mellifera, and patch distribution of Acacia Erioloba which is a protected species. If at all necessary is required to clear some trees / shrubs to access target a site, consent for clearing must be obtained from farm owners and protected tree species must be avoided.

Drilling is done at the final stage of exploration to evaluate the prospect of minerals and determine the feasibility of mining. Drill rods are used to collect geological samples from the earth's subsurface. The drill targets will be generated from the mapping and sampling programmes. The targets grid patterns may range from 200X50m grid spacing to grids of 100m by 50m and in some instances on a 50m by 20m grid spacing during detailed sampling. Exploration activities mainly use two types of drilling; Reverse Circulation (RC) and Diamond Core drilling. Reverse circulation gained prominence due to its effectives and conservative when it comes to water use.

Reverse Circulation drilling often referred to as 'RC' drilling uses rods (shafts) with inner and outer tubes with drill bit attached to an air-filled interchanging piston known as a hammer. The hammer produces drill cuttings that are returned to the surface inside the rods. RC drill are carried on drill rigs, which are mostly powerful heavy truck. RC drilling is the most preferred method because it is less costly and produces liable materials that are free from contamination. In an arid place like Namibia, RC Drilling would be advantageous because it does not require water for rock drilling unlike Diamond core drilling that requires water for lubrication. Once the proposed exploration has been concluded, the impacted sites must be rehabilitated as provided for by the Environmental Management Plan.

2.4 Supporting Infrastructure

2.4.1 Accommodation

During compilation of this report, the proponent expressed two options for accommodation as follows;

Option 1 Geological staff and supporting crew maybe be accommodated at farms to be identified and agreement to be sought with the farm owners, while drilling crews may camp at the drill site or commute from a town nearby, depending on the contracting company. A base camp for accommodation will require to be established in agreement with farm owner. A garbage dump and pit toilet may be established. No hazardous waste shall be dumped in a garbage dump. An impermeable special skip container should be on site for collecting hazardous waste.

At the end of exploration, toilet pits and garbage dump must be dump filled before leaving the site. Alternatively, the use of the mobile toilets is recommended where waste should be disposed at an approved municipal area. To ensure environmental protection from oil, fuel, and lubricants, servicing of vehicles and equipment must take place at an agreed designated area. In event where the farm owner does not allow servicing of the vehicles or machineries, such activities must take place at designated area.

Option 2 All exploration staff could be accommodated in the nearest Otavi town. However for the safety of drilling equipment, security personnel will be required to be onsite and be provided with amnesties as mentioned above.

2.4.2 Access roads

Nationally, the farms covered by the EPL are located on the west of B1 road. Site specific areas in the farms will be accessed via farm roads, and where necessary, access road will be

established to enable movement of vehicles to targets areas. After completion of geophysical sampling these access roads should be rehabilitated in accordance with the EMP and to the farms owners' satisfaction. This must be communicated to the farm owner before any access road is established, and with due consideration of the recommendation of the vegetation study where protected tree species may not be cleared for provision of access roads.

2.4.3 Water Resources

The proponent could provide water to the site with a water truck or enter into an agreement with the farm owner to use the farms existing borehole. The amount of water to be used is not expected to be significant as it would only be used for cleaning of equipment and for household purposes.

Ground water in the area is found at the depths between 50-60m. It will thus possible for to intersect groundwater. In an event where the farm owner would want a drill site to become a water borehole, all necessary permits should be obtained from Ministry of Agriculture Water and Land Reform (MAWLR).

2.4.4 Electricity

Exploration activities do not require significant amount of energy. In most cases, energy is only required for cooking and lighting purposes. The drill rig operates on fuel from the truck on which it is mounted. Various energy source would be used for different purposes. Gas would be used mainly for cooking and heating. A silent generator would be used for lighting and industrial work such as minor welding. While a solar panel may be use for lighting.

2.4.5 Exploration equipment

In the first stages of exploration, geological mapping, geophysical surveys, soil sampling the geological team will use light four-wheel vehicles for sampling. While for geophysical surveys an aircraft of drone could be used. In subsequent years, during drilling, heavy machineries such as truck mounted rig (Diamond Drilling (DD) or Reverse Circulation (RC), Rod carrier (Truck), x4 Light Vehicles (4x4), Compressor mounted truck (RC) and a Water truck.

2.4.5.1 Vehicles

Pickups will be used during the exploration (**Figure 4**). All excavations during trenching and soil sampling programmes will be done manually (**Figure 5**). Water will be supplied by a water trucks. Night driving, reckless driving and speeding are prohibited. A bulldozer may be used for the access road and this must be agreed with farm owners.

Figure 4. Exploration vehicles (For illustration purposes)

Figure 5. An illustration of a hand dug trench (For illustration purposes)

2.4.5.2 Drilling

A 4X4 Lorries and skid mounted drill rig may be used to carry the drill on target sites **(Figure 6**).

Figure 6. A truck mounted RC drill rig and a skid mounted drill rig (illustration only)

2.4.5.3 Airborne Geophysical survey

Arial survey will be undertaken with a fixed wing Cessna plane (**Figure 7**).

Figure 7. An illustration of a fixed wing Cessna

3 DESCRIPTION OF THE ENVIRONMENT

3.1 Environmental parameters

Table 3. The Environmental setting of Otavi Area (Atlas of Namibia)

No	Parameters	Description
1.	Elevation above sea level	1200-1400m
2.	**Climatic Condition;** o Min Average Temperature	

	○ Max Average Temperature ○ Average Rainfall ○ Wind Direction	6-8ºC 32-34ºC 500-550 North-east
3.	Land use	The EPL covers commercial farms which are mainly involved with cattle and crop farming as well as small livestock.
4.	Nearest Water body	The areas receive some of the best rainfall in the country, hence there is plenty of ground water, with average water table at 60m.
5.	Nearest human settlement	Apart from farm workers, the nearest human settlement is at Otavi and Otjiwarongo
6.	Nearest Bitumen road	The site is accessed via B1, the main road between Otavi and Otjiwarongo.
7.	Archaeological / Heritage Site	There was no heritage resource discovered during the study. A chance find was developed to ensure adequate mitigation
8.	Socio-Economic conditions	Commercial farmers and their workers, refer to table 4 for the demography of Otjozondjupa region
9.	Factories / Industries in 5km radius	None.

3.2 Topography

The topography of areas between Otavi and Otjiwarongo is characterised mainly by flat areas in the west while far east of the EPL area some undulation terrain of mountain and hills.

Figure 8. Area Topography

3.3 Geology and Hydrology

Otavi areas fall under what is called the Otavi Mountain Land (OML). The OML are Dolomites and Limestones which were folded and faulted during the Damara Orogen. The Damara Orogen forms a fold belt which extend across northern Namibia. According to the theory of plate tectonics, "*the crust, which represents the uppermost layer of the Earth's inner structure, consists of thick lithospheric plates "swimming" on the liquid mantle. If two plates - together with the continents riding on them - move away from each other, molten rock from the interior erupts onto the surface, while sediments from the erosion of continents accumulate in the resulting rift".*

The interaction between sediments, magma and hydrothermal solution yielded in the development of a mineralised zone during the orogenic processes. This mineralization yielded in the deposit of rich base metal of the Otavi Mountain such as Copper, Zinc and Lead (Namibia Geological Survey 1998).

Figure 9. Locality map showing the Otavi Mountain Land (J.E. Misiewicz 1988)

Otavi areas receive good rainfall (550-600mm) with the good recharge capability of the subsurface water. The water table ranges from 60m which makes groundwater to be the main source of water supply used for crop irrigation and cattle farming.

3.4 Ecology

3.4.1 Description of the Biophysical Environment

The impact that mineral exploration and related activities may have on the environment includes both bio-physical and social elements. This section focuses on the bio-physical i.e. ecological aspects of the project area. An Ecological Impact Assessment was undertaken to assess the potential impacts. The study was informed by a comprehensive literature review followed by a site visit. The findings and recommendations are summarised below.

The Exclusive prospecting Licence, EPL 7850 fall within Otavi District in north-central Namibia. The general vegetation type of the area could be described as Karstveld which is dominated by Acacia trees and shrub savanna which is characterized by a scattered distribution of tall trees and low shrubs. The study area is vast and many habitats are expected to occur in the respective landscapes.

The soil is sandy, ranging in colour from pale brown and grey with broken calcrete and limestone pieces in it, to fine red sand in some areas.

The EPL spread over many farms with various farming activities as the land-use. The land-use on the foothills is limited to grazing while some of the plains are used for mixed use including cultivation of crops.

3.4.2 Flora

A site visit was undertaken on 24-25 November 2023, the area had just received rainfall and many vegetation were beginning to flower while some remained dry looking. During site visit, extensive de-bushing operation for charcoal production was observed (**Figure 10**), while at areas where de-bushing has not occurred, dense vegetation cover of *Acacia mellifera* species where observed.

Figure 10. De-bushed tree branches of *Acacia mellifera* for charcoal production

The pictures of the dominant plants are presented in the subsequent table with their conservation status. Generally, the area has a high plant diversity owing to the different habitat types and landscapes in the area however it is heavily encroached by Acacia mellifera species. The prominent plant species are shown **Figure 11** below.

Acacia mellifera (Black Thorn-Acacia)
No protection status

Acacia mellifera b ranches

Peltophorum africanum
No protection status, IUCN
Conservation status: Least Concern.

Aloe Litoralis
Protected

Peltophorum africanum
Branches

Figure 11: Prominent vegetation in the EPL area

3.4.3 Fauna

The study area falls on farming land with livestock being reared. Wild animals, Warthog (*Phacochoerus africanus)*, Kudu (*Tragelaphus strepsiceros)*, Aardvark (*Orycteropus afer),* Bat-eared Fox (*Otocyon megalotis),* Dik-dik *(Madoqua damarensis),* Steenbok *(Raphicerus campestris)*, Gemsbok (*Oryx gazelle*) and Springbok *(Antidorcas marsupialis,* Water Buck, Baboon were observed during the site visit. It was confirmed by the farm inhabitants that Cheetah *(Acynonyx jubatus),* do occur in the area as well as Birds such as Vultures and reptiles.

3.5 Ecological Impact Assessment

The proposed exploration activities are not expected to include significant vegetation removal or habitat destruction. It is however important to put mechanisms in place to ensure that unintentional disturbance is averted. Should the exploration yield feasible data for mining operation, it will be inevitable for some tree to be affected. A comprehensive vegetation study at the mining area should be conducted by then.

3.6 Population Demography

Otavi and Otjiwarongo fall under Otjozondjupa region with the population of about 144 000 people. The unemployed rate in the region is estimated to be at 37% which is relatively low compared to many regions in the country that have over 50%. This could be attributed by the number of mines and high yield farms in the region which create a high number of employment opportunities. Some of the biggest mine such B2Gold is located 15km from south west of the EPL. This is a clear indication that, in addition to agriculture, mining is one of major economic activity in the region which has a huge potential to uplift the local and national economy.

Table 4. Population Demography for Otjozondjupa Region *(Namibia Population and Census Report of 2011)*.

	2011	2001			2011	2001
Population Size				Literacy rate, 15+ years, %	83	67
Total	143 903	135 384				
Females	70 001	65 488		Education, 15+ years, %		
Males	73 902	69 896		Never attended school	20	22
				Currently at school	11	10
Annual growth rate (%)	0.6	2.8		Left school	66	53
Percent in Urban/Rural areas				Labour force, 15+ years, %		
Urban	54	41		In labour force	72	52
Rural	46	59		Employed	63	68
				Unemployed	37	32
Sex ratio: Males per 100 females				Outside labour force	20	49
	106	107		Student	46	31
Population density				Homemaker	16	46
People per sq. km.	1.4	1.3		Retired, too old, etc.	29	23
Age composition, %				Housing conditions, %		
Under 5 years	14	14		Households with		
5 – 14 years	22	24		Safe water	95	94
15 – 59 years	58	55		No toilet facility	39	43
60+ years	6	5		Electricity for lighting	56	42
				Wood/charcoal for cookir	56	60
Marital status: 15+ years, %						
Never married	57	55		Main source of income, %		
Married with certificate	18	15		Household main income		
Married traditionally	9	10		Farming	10	15
Married consensually	11	13		Wages & Salaries	60	55
Divorced/Separated	2	2		Cash remittance	6	10
Widowed	2	3		Business, non-farming	10	8
				Pension	10	7
Citizenship, %						
Namibian	94	89		Fertility		
Non-Namibian	6	11		Average number of children per w	4.0	4.1
Main language spoken at home,				Disability, %		
Percent of households				With disability	5	4
Otjiherero	27	28				
Oshiwambo	21	20				
Nama/Damara	21	22				
Private households						
Number	33 192	25 338				

3.7 Heritage and Archaeology

3.7.1 Introduction

The United Nation Education Scientific Cultural Organization (UNESCO) provide the definition of Heritage and Archaeology as follows;

"World Heritage is the designation for places on Earth that are of outstanding universal value to humanity and as such, have been inscribed on the World Heritage List to be protected for future generations to appreciate and enjoy. Places as diverse and unique as the Pyramids of Egypt, the Great Barrier Reef in Australia, Galápagos Islands in Ecuador, the Taj Mahal in India, the Grand Canyon in the USA, or the Acropolis in Greece are examples of the 1007 natural and cultural places inscribed on the World Heritage List to date".

"Archaeology is the study of human cultures through the analysis of their historical traces and their context which aims at explaining the origin and development of civilizations, as well as the understanding of culture and history. Underwater archaeology is a sub-discipline, which studies submerged sites, artifacts, human remains and landscapes".

Evidence of the presence of human and their ancestors in Namibia is said to be beyond written record. Evidence of their existence is provided by graves, dwelling places, stone tools and a wealth of rock art which dates back to the Southern African Middle Stone Age[1].

With the above understanding and experience, a holistic approach to study the heritage and archaeology was adopted. The two-phase approach included a comprehensive literature review to establish the baseline of existing heritage resources and a foot survey on the EPL.

[1] John Kinahan 2011

3.7.2 Policy and legal framework

The World Heritage Convention, created in 1972 is aimed to the Protection of the World Cultural and Natural Heritage. Namibia, is a signatory to this convention. The Namibian government has committed to the protection of cultural and heritage through the National Heritage Council Act 27 of 2004. This act provides for the protection and conservation of places and objects of heritage significance and the registration of such places and objects; to establish a National Heritage Register; and to provide for incidental matters.

3.7.3 Literature Review

Literature study was necessary due to the relatively vastness of the EPL. This EPL did not contain Heritage Resources. The *Hoba Meteorite* and the Berg Aukas mountains in the region are over 100kms in north west away from the EPL.

3.7.3.1 Hoba Meteorite

Hoba Metorite located about 20km west of Grootfontein and 40km south east of the EPL thus not in close proximity. The Meteorite landed about 80,000 years ago and is believed to be the biggest meteorite ever found on earth weighing 50 tonnes. It is estimated to be between 200 and 400 million years old and is declared a word heritage site.

3.7.3.2 Otavipithecus namibiensis,

Narrating their story on human history in Namibia, Glenn C. Conroy and fellow archaeologist indicated that, “the afternoon of June 4, 1991, we were searching Namibia's mountains for a rarer kind of stone, fossilized evidence of human evolution in southern Africa. What we found

instead was the rarest “diamond” of all, one that no one had ever seen before on the African continent south of equatorial East Africa. What we found was incontrovertible evidence that prehuman “apes” were living in southern Africa millions of years before *Australopithecus* roamed the veld”[2] The discovery was the middle Miocene hominoid *Otavipithecus namibiensis,* found at the Berg Aukas mountains in Otavi area which is traced back to millions of years.

3.7.3.3 Foot survey

A foot survey was carried out for Heritage Impact Assessment (HIA) which approximately covered about 20% of the EPL area. Namibia does not have standard procedure and guidelines to undertake HIA. This study adopted world’s best practises guidelines[3] and criteria for assessing heritage resource significance and site vulnerability to mining[4]. In consultation with locals and random movement on site as well the use of National Heritage Register, there were no heritage or archaeological sites found, neither known on the EPL

The foot survey did not find heritage resources such as graves and burial grounds, building and structures, landscapes of cultural significance, paleontological. In terms geology, the area geological setting has potential of dimension stones of granite, sandstones and dolomite forms that are associated with archaeological landscapes that may constitute characteristics of Later Stone Age (LSA)). However, the investigation of LSA in dimension stones can only be establish with drilling as there are not distinct outcrops. Furthermore the complementary study of ecology has determined trees that a protected and directly forms part of the heritage resources and their mitigation measures are developed and contained in the EMP.

3.7.4 Mitigation measures

[2] Glenn C. Conroy *et al* 1993
[3] Burke and Smith, 2004; ICOMOS 1999; Cleere, 1989
[4] Kinahan (2012)

In the absence of finding heritage resources the world's best practise is to develop a chance find mitigation measure for implementation. The chance find provides awareness of heritage resource to the exploration team and ensure that such resources are not tempered with or destroyed. A chance find is known to be the most practical mitigations for heritage resource as provides for larger protection at sites where the foot survey did not access. The proponent should implement a chance find procedure as follows;

1. All employees / contractors must be trained on the possible find of heritage resources before the commencement of the project in order to create awareness. The training must be provided by an expert to ensure adequate understating of heritage resources.
2. The proponent / employees / contractors must implement steps to be taken for archaeological material finding (Heritage (rock painting and drawings), human remains or artefacts) are unearthed through the following procedures;
    i. Stopping the activity immediately
    ii. Informing the operational manager or supervisor
    iii. Cordoned of the area with a danger tape and manager to take appropriated pictures.
    iv. Manager/supervisor must report the finding to the following competent authorities, National Heritage Council of Namibia (061 244 375) National Museum (+264 61 276800) or the National Forensic Laboratory (+264 61 240461).
3. Archaeological material must NOT be touched. Tempering with the materials is an offence under the heritage act and punishable upon conviction by the law.

3.7.5 Conclusion

The known heritage resource are protected and demarcated, hence it is not possible for them to be disturbed. Since there was no find of heritage resource on the EPL, the study is safely recommending the issuance of the ECC to the company to commence with its exploration activities with strict implementation of the recommended chance above.

3.7.6 Project Alternatives

The provision of EMA requires an EIA to explore various project alternative which aims to ensure that a chosen project component does not have significant impact to the environment. Project alternative ranges from not implementing the project (No go alternative), when the environmental impacts are severe, or there is high degree of uncertainty. Other alternative considers the project site, technology and equipment to be used. The description of alternatives is given in **Table 5** below.

Table 5. Analysis of Project Alternative

Alternative	**Description**	**Advantages**	**Disadvantage**	**Chosen Option**
No Project	This alternative would keep a status quo	There would be NO environmental threats such as; • Waste Generation with potential Surface and Ground Water Pollution • Habitat destruction / Land degradation by Construction / upgrading of access roads • Drilling of holes • Social effect on Human Health and Safety Risk	The following benefits would be lost if the project does go ahead. • Prospective of new mining project that culminate into loss of income • Compromise on government development goals of manufacturing and industrialization • Increase in poverty reduction through loss of employment opportunity	NO

Alternative	Description	Advantages	Disadvantage	Chosen Option
Project Site	Exploration activity follow mineralization of mineral. Hence there is no specific site. However, activities shall by all mean avoid protected sites and minimize environmental damage.			
Implement project	This entails the implementation and operation of the project	• Enhance development • Enhance skill and capacity building • Improved technology transfer Increase chances of establishing of a new mine	The natural environment may be disturbed, but with adequate implementation of the Environmental Management Plan, environmental sustainability shall be achieved.	Yes
Drilling Type: • **RC vs Diamond**	Cost effective Does not require water for lubrication compared to Diamond drilling	• RC drilling: This type of drilling is ideal as it does not require water for lubrication and cooling, hence it conserve water compared to diamond drilling	No significant disadvantage to the environment	RC Drilling

4 LEGAL AND POLICY FRAMEWORK

Table 6. Policy and Legal framework for the proposed project

Legislation	Summary	Applicability to Assessment
The Namibian Constitution	The State shall actively promote and maintain the welfare of the people by adopting policies aimed at … The maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future	Protection of the environment and biodiversity. Ensures that these principles are enshrined in the EIA documentation
Environmental Management Act No. 7 of 2007	To promote sustainable management of the environment and the use of natural resources and to provides for a process of assessment and control of activities which may have significant effects on the environment; and to provide for incidental matters	The Act provides a list of activities that may not be undertake without an environmental clearance certificate to prevent environmental damages.
Minerals (Prospecting and Mining) Act No 33 of 1992	Prospecting and Mining of Mineral in Namibia and Issuance of all Permits. Section 50 (i) requires "an environmental impact assessment indicating the extent of any pollution of the environment before any prospecting operations or mining operations are being carried out and an estimate of any pollution, if any, likely to be caused by such prospecting operations or mining operations"	Issuance of Mining permits. The proposed activity is prospecting for minerals; hence it requires an EIA to be carried out and adhere to the act's provisions.

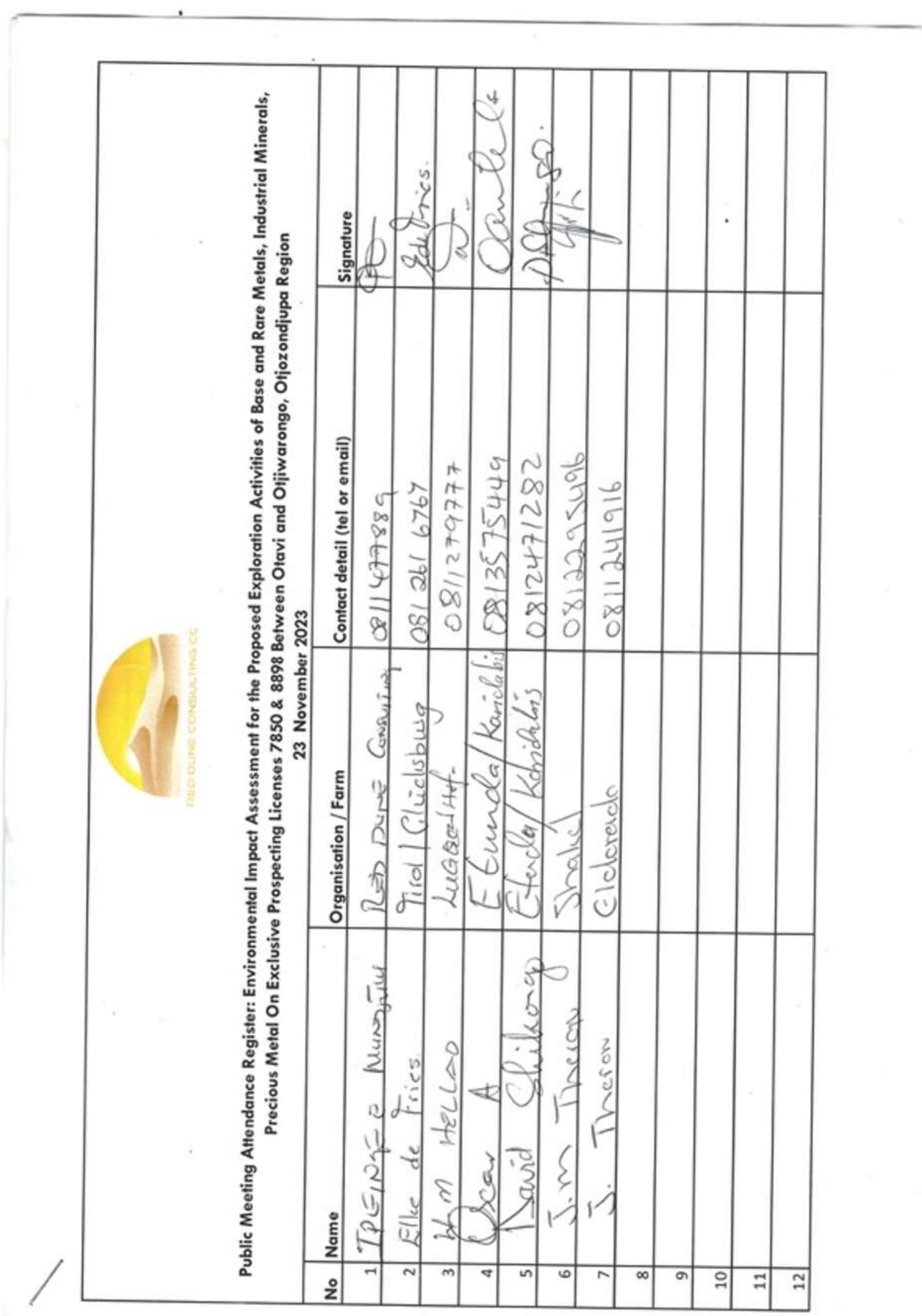
Legislation	Summary	Applicability to Assessment
Draft Pollution Control and Waste Management Bill	This Bill serves to regulate and prevent the discharge of pollutants to air and water as well as providing for general waste management.	To protect the Environment from possible hydrocarbons and oil leaks from the machinery, trucks and vehicles.
Environmental Policy framework (1995)	This policy subjects all developments and project to environmental assessment and provides guideline for the Environmental Assessment.	Consideration of all possible impacts and incorporate them in the development stages
Regulations Related to the Health and Safety of Employees at Work. Reg No. 156	Promotes the Safety and Health of employees at the work place	To ensure employees health and safety at work
Public Health Act No. 36 of 1919	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.	To ensure that the project is not a nuisance to land owners and the public at large
Labour Act No. 11 of 2007	This Act outlines the labour laws which encompass protection and safety of employees at work.	Fair labour practises to be observed with regard to this act
Water Act No, 54 of 1956	All water resources belong to the State. It prevents pollution and promotes the sustainable utilization of the resource	Prevention of discharging contaminated water at unauthorised places

Legislation	Summary	Applicability to Assessment
Soil Conservation Act No. 76 of 1969	To promotes the conservation and compacting of soil erosion	Uncontrolled movement of heavy vehicles and truck at areas surrounding the site may cause land degradation
Water Resource Management Act No.11 of 2011	The Act stipulates the prevention of pollution for Surface and Ground water sources.	Oil spillage coming from machinery requires proper monitoring.
Public Health Act no. 36 of 1919	The Act gives provision for the protection for the health of all people.	The noise and dust level emanating from the project could affect the surrounding community and vegetation in the vicinity.
National Heritage Act No.27 of 2004	The Act gives provision of the protection and conservation of places and objects with heritage significance.	The chance find of Human Remains due to colonial history or crime, Artefacts, and or heritage materials within the EPL

5 PUBLIC CONSULTATION

The provision of the EMA requires an EIA process to follows a comprehensive public consultation. This is an important process, because it gives members of the public, especially the Interested and Affected Parties (I&APs) to comment or raise concerns that may affect the socio-economic or general environment because of the project. Furthermore, it solicits crucial local knowledge that the Environmental Assessment Practitioner may not have.

Farm owners where initially consulted through the Otavi Farmers Association. A WhatsApp and email group for the farms was created where the background information document, site notices, and invitation for public meeting was communicated. Registered and Interested parties were send the BID through email. The initial public consultation was planned for 17th November 2023 at Khorab Lodge in Otavi but, some farmers indicated unavailability. A public meeting was eventually held on 24th November 2023 at Khorab Lodge (See **Figure 12 below**, attendance register).



RED DUNE CONSULTING CC

Public Meeting Attendance Register: Environmental Impact Assessment for the Proposed Exploration Activities of Base and Rare Metals, Industrial Minerals, Precious Metal On Exclusive Prospecting Licenses 7850 & 8898 Between Otavi and Otjiwarongo, Otjozondjupa Region

23 November 2023

No	Name	Organisation / Farm	Contact detail (tel or email)	Signature
1	IPEINGE [illegible]	Red Dune Consulting	0811477889	[illegible]
2	Elke de Fries	Tirol / Glücksburg	081 261 6767	[illegible]
3	H M HELLAO	Luggard Hof	0811279777	[illegible]
4	Oscar A	Etunda / Karidabis	0813575449	[illegible]
5	David Shikongo	Etunda / Karidabis	0812471282	[illegible]
6	J.M Theron	Shakel	0812295496	[illegible]
7	J. Theron	Eldorado	0811241916	
8				
9				
10				
11				
12				

Figure 12. Attendance Register for the public meeting

5.1 Newspaper Advertisement

The EMA requires that, the project must be advertised into two (2) daily newspapers that are widely circulated in the country. The project was advertised in the New Era and Confidante newspapers on 15th and 16th and 21st and 23rd November (Please see proof of public consultation).

5.2 Public Meeting

The public meeting was not attended by many farmers. Some farmers indicated that there has been frequent meeting of EIAs which they believed are similar and it was not necessary for them to attend. They have rather requested that the final documents are shared with them.

During the meeting, Red-Dune through a PowerPoint presentation, presented the objective of the meeting, and the overall aim of the EIA, its process and the potential negative and positive impact that exploration activities may cause.

5.2.1 Environmental Impact Assessment (EIA) process

Red-Dune gave an overview of the mineral exploration process and the environmental impact assessment process as per the provision of the Environmental Management Act 2007, (Act No 7 of 2007) and the scope of the project.

The farmers were informed of their importance for participating in the EIA to ensure critical environmental issues are considered. For example, if farm A has tourism activities, which requires bird siting and the proponent is flying over simultaneously, this may disturb the birds/game at that specific time. Therefore, information to guide flying time may come from the farmers. Another example is that, if a specific site has a social value (i.e. cemetery) and the farmer doesn't want it to be accessed/disturbed, the farmer has the right to refuse the proponent from entering that site.

Once the EMP is approved by the Environmental Commissioner, then it becomes a legal guiding tool for the proponent to undertake the exploration process. The proponent is required to rehabilitate any physical exploration done on an area, failure to do so, the farmer has the right to report them to MEFT and the proponent is liable to conviction under the EMA.

To enlighten the farmers, a list of the potential environmental threats identified were given and their mitigation measures explained as stated in the environmental management plan (EMP);

- Site Access Conflict: Farm entry permission
- Safety Risk: Employees
- Soil and Ground Water pollution: Fuel, Oil, and Lubricants
- Biodiversity Loss: Clearing of vegetation for site access
- Human Wildlife conflict and Poaching
- Drilling activities: Wild life disturbances, Dust & Noise, Spill of Hydraulic Fluids & Ground water
- Land Degradation: Use of heavy vehicle on farm roads
- Pollutions: Solid waste generated by workers, ablution facilities

The mitigation measures for the above impacts are outlined in the Environmental Management Plan. Issues raised during the meeting are presented in **Table 7** below.

Table 7. Meeting Minutes

No	Input / Comment / Concern	Response by Red-Dune	Section where it is addressed
1.	Lack of consultation of the EPL owner with the farm which cause conflict on farm access / entry.	EPL owner are caution to ensure proper consultation to obtain farm access from the farm owner.	The EMP table, Farm Access
2.	Theft of livestock and poaching of game meat is rife in the area and	Exploration team are discouraged to have weapons	The EMP table

No	Input / Comment / Concern	Response by Red-Dune	Section where it is addressed
	exploration employees could be involved in livestock theft and poaching.	and snares. The exploration manager must ensure his / her team is not involved in livestock theft and poaching	Impact on Fauna
3.	Potential underground water pollution, particularly during the mining phase if the exploration yield into mining. How can farmer ensure that the mine will not be polluting underground water. Does government have monitoring mechanisms in place to monitor the potential impact of mining activities to ground water? Or are the mines regulating themselves in this regard?	Before mining commences, the mine establishes groundwater quality baseline which will be the basis of monitoring ground water quality. The mine further establishes ground water monitoring boreholes whereby monitoring reports are provided to the regulatory authority to assess performance of ground water quality against mining activities. In many cases, government does not set up independent mechanism to monitor ground water quality against mining activities. It is challenging to determine self-regulation of the mines when it comes to monitoring of groundwater. However, this concern requires to be addressed by the MAWLR.	Section only pertaining to exploration phase
4.	Farm access entry does not mean EPL owners and their exploration team could cut down trees as they	This concern is addressed in the EMP, and farmer must ensure that the access	The EMP table, Impact on Fauna

No	Input / Comment / Concern	Response by Red-Dune	Section where it is addressed
	wish. They must inform farm owners.	agreements outlines the rules of engagement.	
5.	During drilling, heavy vehicles tend to damage farm loads, EPLs owner must ensure adequate rehabilitation of farm roads.	This concern is addressed in the EMP, the EMP will be a legal binding documents and EPL owners are compelled to abide by it.	The EMP table, Land Degradation
6.	The exploration team must not leave scattered litter at their drilling site or camp site and they must ensure that they have mobile toilet and adequate ablution facility. It also not a sustainable practise to set latrine which will be back dumped after a short-lived exploration activities. Rather, only have an option for mobile toilets of which garbage could be pumped into an appropriate sewer facility.	This concern is addressed in the EMP. The pit-latrine is not a **MUST**, but always a provision. This must first be agreed with the farm owners	The EMP table, Waste Generation
7.	No exploration team will be allowed to carry a weapon / snare into the farm. Anyone with a weapon, must inform the farm owners.	This is noted, and addressed in this Scoping and EMP that no weapons and snares are allowed on site / farm	The EMP table, Impact on Fauna
8.	What happens when a feasible deposit is found in my farm? How will I benefit?	The farmer will benefit through legal agreements that he/she will have with the Mine owners.	Not in scope of the report

6 IMPACT ASSESSMENT

6.1 Impact Identification

Potential impact were identified in accordance to the key Environmental Social Indicators (ESI)[5] and using literature review, site assessment and public participation process. Red-Dune consulting has undertaken numerous scoping study for the exploration activities in Otjozondjupa, thus it has adequate experience on potential impact that the proposed exploration activities will have on the environment.

6.1.1 Air Environment

Project activities that have potential of creating dust emission such as uncoordinated driving and drilling could deteriorate surrounding air quality from fugitive dust. Excess dust during work could be a health hazard to workers and the surrounding communities.

6.1.2 Noise Environment

Movement of heavy trucks and drill rigs, and drilling activities could produce excessive noise which could be noise nuisance to communities and hearing hazards to workers. Additionally, noise maybe generated from playing loud music or unnecessary hooting and revving of vehicles.

[5] Guidance Note UNDP Social and Environmental Standards Social and Environmental Assessment and Management July 2022

6.1.3 Water Environment

Drilling of boreholes has the potential of polluting underground water resources through oil spills. The project does not involve water abstraction, however, water maybe intercepted during collecting of geophysical samples by drilling.

6.1.4 Biodiversity Environment

Access to some of the generated sampling target will require clearing of vegetation which may lead to destruction trees and animals habitats.

6.1.5 Land Environment

Land degradation could happen if the movement of heavy vehicle in an area is not coordinated. Other project activities could produce household and industrial pollution, both solid and liquid which could pollute the land environment.

6.1.6 Employees And Community Health and Safety Environment

Occupational health and safety at workplace is a critical component to promote the welfare of the employees and public. The employment opportunities will create new social relationship which has the potential spreading diseases such as HIV-AIDS and workers as susceptible to vector diseases such as malaria. The bush working environment makes workers to be prone to venomous insect and snake bites which may lead to fatalities. Other health risk include workers exposure to excessive noise and dust and injuries.

6.1.7 Heritage and Archaeology Resources

The exploration team may stumble on heritage and archaeological resource during activities such as clearing of vegetation while drilling has the potential to unearth archaeological material. A chance find is developed towards protection of heritage and archaeological resources.

6.2 Impact Assessment

6.2.1 Criterial for impact assessment

The criteria used to assess the impacts and the method of determining their significance is outlined below. This process conforms with international best practices and the Environmental Impact Assessment Regulations of Environmental Management Act, 2007 (Government Gazette No. 4878) EIA regulations.

6.2.1.1 Impact Type

Following the impact determination, the impacts are classified into two categories; positive and negative impacts.

Table 8. Impact Type

Impact type	**0**	No Impact
	+VE	Positive
	-VE	Negative

6.2.1.2 Probability of occurrence

All potential impacts are analysed to determine their likelihood of occurrences after proposed mitigation measures / residual effect after applying the developed mitigation measures.

Table 9. Likelihood occurrence

Likelihood occurrence	1	Improbable (Low likelihood)
	2	Low probability
	3	Probable (Likely to occur)
	4	Highly Probable (Most likely)
	5	Definite (Impact will occur irrespective of the applied mitigation measure)

6.2.1.3 Confidence level

The level of confidence residual effect[6] predictions which depends on the degree of uncertainty associated with the basis of understanding project interaction with the environment, available data/information, and the effectiveness of proposed mitigation. The confidence is determined under three levels Low, Medium and High (**Table 10**). When the uncertainty associated with the residual effect prediction increases, the level of confidence in the prediction becomes lower.

It is often best practise to undertake a specialist study to understand and develop appropriate mitigation measures, for impacts with lower confidence, however, for the proposed exploration activities, a precautional approach was developed.

For example, the confidence level of uncertainty residual effect of noise, dust, vegetation disturbances and land degradation impacts by exploration activities is high. However, the confidence level of uncertainty residual effect of drilling activities on the impact to heritage /

[6] Residual impacts refer to those environmental effects predicted to remain after the application of mitigation outlined

archaeological resources is lower (thus a chance find is often developed as a precaution to mitigate the impact).

Table 10. Confidence level

Confidence level	L	1	Low	The uncertainty residual effect maybe well understood, but the impact severity is not known. Precautional approach mitigation measures based on literatures / world best practises are developed to reduce the impact significance to low levels.
	M	2	Medium	The uncertainty residual effect is partially understood with available information and practical mitigation measures with monitoring program to reduce the impact significance to low levels.
	H	3	High	The uncertainty residual effect is well understood and practical mitigation measures are developed to mitigate the impact significance to low levels.

6.2.1.4 Impact Significance

The residual effect prediction of the impact were rated under 5 categories; negligible=1, Low=2, Medium=3, High=4 and Severe=5.

Table 11. Risk Rating

1	**Negligible** (Based on the available information, the potential impact is found to not have a significant impact)	N
2	**Low** (The presence of the impact's magnitude is expected to be temporal or localized, that may not require alteration to the operation of the project	L
3	**Medium** (This impact is probable, limited in scale, expected to be of short term / temporary, can be avoided, managed and or mitigated with simple mitigation measures.	M

4	**High** (The impact is definite, mostly predictable, temporal, can be local, regional or national and in long term and reversible. These are impacts that may affect human rights, lands, natural resources, traditional livelihood, critical ecosystem services. The severity of these impact are more limited than sever impacts.	H
5	**Severe** (The impact is definite, it has significant adverse impacts on human population and or / the environment which are of large-scale magnitude and or spatial extend such as large geographic area, large number of people or transboundary nature. The impact duration is long term, permanent and often irreversible. Impacts include displacement of human, destruction of critical ecological systems and or cultural and heritage sites etc. The impact could have a no-go implication unless the project is re-designed or proper mitigation can practically be applied.	S

6.2.1.5 Duration of Impacts

Under this criteria, the impact is analysed based on the time at which the impact will last. During exploration, most of the impact are immediate and short term.

Table 12. Impact duration

Duration	1	Immediate
	2	Short-term (0-5 years)
	3	Medium-term (5-15 years)
	4	Long-term (more than 15 years)
	5	Permanent

6.2.1.6 Geographical Scale

The impact is further analysed based on its geographical scale or spatial extend. For example, noise pollution from drilling activities will be site specific, while noise from aircraft will be

local as the plane will make turns at local areas that are not target for aerial survey. Positive impacts such as potential government revenue through taxes and levies will be national, and employment will mainly be regional.

Table 13. Geographical extend of impact

Scale	1	Site specific
	2	Local
	3	Regional
	4	National
	5	International

6.2.1.7 Risk Assessment

The impact significance was determined using a risk matrix **(Table 14 below).** A five-by-five matrix was used where the impact severity was categorised and assigned scores from 1 to 5 as follows: Improbable=1, Low=2, Medium=3, High=4 and Severe=5. Similarly, the likelihood was assigned scores as follows; improbable=1, Low Likely=2, Probable=3, High Probability=4, Definite=5. The impact rating was determined by multiplying the impact severity and likelihood.

Table 14. Risk assessment matrix[7]

LIKELIHOOD						
	5 Definite	5 Low	10 Medium	15 High	20 Severe	25 Severe
	4 High Probability	4 Low	8 Medium	12 High	16 High	20 Severe
	3 Probable	3 Low	6 Medium	9 Medium	12 High	15 High
	2 Low	2 Low	4 Low	6 Medium	8 Medium	10 Medium
	1 Improbable	1 Negligible	2 Low	3 Low	4 Low	5 Low
		1 Negligible	**2 Minor**	**3 Medium**	**4 High**	**5 Severe**
		IMPACT SEVERITY / CONSEQUENCE				
		Negligible	Low	Medium	High	Severe

6.3 Mitigation Hierarchy

Best practises call for mitigation measures to follow a mitigation hierarchy that favours (i) avoidance of potential adverse impacts, and where avoidance is not possible, then (ii) minimization and reduction; where adverse residual impacts remain, then (iii) mitigation measures need to be applied, and, as a last resort, (iv) measures to offset impacts that cannot be appropriately mitigated.

According to EIS regulations, the objectives mitigations are to;

- Find environmental ways of doing thing
- Promote environmental benefits of the project
- Avoid, Minimise or remedy negative impacts and
- Ensure that residual negative impacts are within acceptable levels,

[7] Risk Management Guideline for the BC Public Sector (Province of British Columbia Risk Management Branch and Government Security Office 2012)

Further, during consideration of the mitigation measure, the following mitigation hierarchy was followed;

- Avoid the negative impact through preventative means,
- Minimise the negative impacts to acceptable low levels and,
- If the above two are not possible, remedy or compensate the impact.

6.4 Potential Negative Impacts of the Project

- Noise pollution from heavy machinery and drilling
- Soil disturbance / land degradation
- Loss of habitat and biodiversity from site preparations and occupation
- Air pollution from vehicle emission and dust emission from drilling activities
- Health and Safety risk
- Risk of pollution from generated domestic solid wastes
- Risk of contamination of ground water from oil, grease and lubricants from heavy vehicles, and drilling activities.

6.5 Potential Positive Impact of the project

- Direct and indirect creation of employment opportunities
- Knowledge and technology transfer.
- Reduction of poverty to the local community through increase income generation.
- Increased economic activities in the towns of Otavi and Otjiwarongo
- Increase in National economy through payments of taxes.

6.6 Planning Phase: Impact Assessment

To ensure that the project is accepted by the public and avoid possible conflicts, the project was advertised in local newspaper, a WhatsApp group for directly affected stakeholders created and a public consultation was arranged.

6.7 Exploration Phase: Impact Assessment

Table 15. Socio-Economic Impacts Assessment

Project-Environment Interaction	Description	Mitigation Measures	Impact type	Likelihood occurrence	Severity	Impact Rating	Geographical Extend	Duration	Reversibility (R)	Significance	Confidence Level
Employment / Socio-Economic advancement of local	Possible exclusion of locals / Otavi and Otjiwarongo community from job opportunities. Unfair compensation of workers. Procurement of good and services from outside Otavi and Otjiwarongo. It is not anticipated that a significant number of employment will be	1. Ensure that all general work is reserved for local people unless in circumstances where specialized skills are required. 2. Fair compensation and labour practice as per Namibian Labour Laws must be followed 3. Ensure skill transfer to the locals 4. Use local supplier for good	+ve	2	2	4	Regional	Life of project	n/a	Low Not Significant	High

Project-Environment Interaction	Description	Mitigation Measures	Impact type	Likelihood occurrence	Severity	Impact Rating	Geographical Extend	Duration	Reversibility (R)	Significance	Confidence Level
	created during exploration.	and service where possible									
Farm Access	Possible conflict with EPL owner and farm owner on entry / access to in the farm where the EPL is located.	1. Prepare an access / entry contract agreement and present it to the farmers for the scrutiny 2. Inform farmers well in advance before planned exploration activities 3. All people entering the farm must carry identification documents 4. Do not enter farms without owners consent	-ve	2	2	4	Site specific	Immediate	n/a	Minor Not significant	High

Project-Environment Interaction	Description	Mitigation Measures	Impact type	Likelihood occurrence	Severity	Impact Rating	Geographical Extend	Duration	Reversibility (R)	Significance	Confidence Level
Health and Safety for employees and general public	Job opportunities leads to new social relationship which often spread disease, particularly pandemic such as HIV and AIDS and substance abuse. Hiring off unlicenced employees to operate vehicles and special machinery pose safety risk to themselves, co-workers and public. Additionally, employees are subject to dust and noise pollution as well	1. Provide awareness to the employees on dangers of HIV/AIDS, alcohol and drug abuse 2. Provide condoms on site 3. Develop a safety plan 4. Ensure that every employee goes through an induction course about safety to train employees on health and safety. 5. All drivers must be in possession of appropriate driver's licenses 6. Adequate safety signs must be put at designated places. 7. Provide safe wears such as, overalls, safety boots, safety	-ve	2	2	4	Site Specific and Local	Project Duration	n/a	Low Not Significant	Hig h

Project-Environment Interaction	Description	Mitigation Measures	Impact type	Likelihood occurrence	Severity	Impact Rating	Geographical Extend	Duration	Reversibility (R)	Significance	Confidence Level
	as other occupational health and safety issues	eyeglasses, Hand gloves and hard hat etc to employees 8. Adhere to the Labour act, non-toxic human dust exposure levels may not exceed 5mg/m3 for respiratory dust and 15mg/m3 for total dust. 9. Employees must NOT be exposed to noise levels above the required -85dB (A) limit over a period of 8 hours. 10. Abide by the Occupational Health and Safety and Labour Act of Namibia and other statutory requirement such as International Labour Practise (ILO)									

Project-Environment Interaction	Description	Mitigation Measures	Impact type	Likelihood occurrence	Severity	Impact Rating	Geographical Extend	Duration	Reversibility (R)	Significance	Confidence Level
		11. Ensure adequate first aid kit on site taking into consideration, insect and snake bites 12. Supervisors must undergo an occupational health and first aid course, 13. Supply clean drinking water to the site, such as portable water tank; 14. 4. Used gendered mobile toilets 15. 7. Provide insect repellent, mosquito nets and if necessary immunization to prevent deadly diseases such as malaria.									

Project-Environment Interaction	Description	Mitigation Measures	Impact type	Likelihood occurrence	Severity	Impact Rating	Geographical Extend	Duration	Reversibility (R)	Significance	Confidence Level
Heritage and Archaeology	Potential unearthing of archaeological material or damaging heritage resources	1. 1. Employee must be trained on the possible find of heritage and archaeological material in the area; 2. 2. Implement a chance find and steps to be taken for heritage and archaeological material finding (Heritage (rock painting and drawings), human remains or artefacts) are unearthed 3. Stopping the activity immediately i. Informing the operational manager or	-ve	2	2	4	Site Specific	Life of project	R	Low Not Significant	High

Project-Environment Interaction	Description	Mitigation Measures	Impact type	Likelihood occurrence	Severity	Impact Rating	Geographical Extend	Duration	Reversibility (R)	Significance	Confidence Level
		supervisor ii. Cordoned of the area with a danger tape and manager to take appropriated pictures. iii. Manager/supervisor must report the finding to the following competent authorities, National Heritage Council of Namibia (061 244 375) National Museum (+264 61 276800) or the National Forensic Laboratory (+264 61 240461).									

Table 16. Bio-Physical Impacts Assessment

Project-Environment Interaction	Description	Mitigation Measures	Impact type	Likelihood occurrence	Severity	Impact Rating	Geographical Extend	Duration	Reversibility (R)	Significance	Confidence Level
Biodiversity: Flora	Destruction of trees	1. Line cutting must avoid mature and protected plant species. 2. Ensure that access roads are rehabilitated after use to enhance revegetation	-ve	2	2	4	Site Specific	Life of project	R	Low Not Significant	High
Biodiversity: Fauna	Destruction of animal habitats such as bird nests, poaching, stealing of livestock	1. Do not kill animal, unless such animals pose eminent danger to humans 2. There must be ZERO tolerance to poaching to ensure this, no weapon and traps are allowed on site; 3. There must be ZERO	-ve	2	2	4	Site Specific	Life of project	R	Low Not Significant	High

Project-Environment Interaction	Description	Mitigation Measures	Impact type	Likelihood occurrence	Severity	Impact Rating	Geographical Extend	Duration	Reversibility (R)	Significance	Confidence Level
		tolerance on livestock theft.									
Surface and Ground Water Pollution	Heavy vehicle and machinery may pollute water sources from leakages of oils, hydraulic fluids, lubricants and greases. These pollutants may reach underground water through seepage. Further surface water may be polluted from surface run off soils that is polluted.	1. Fuelling of heavy vehicle on site must be well coordinated at designated places, 2. Stationary vehicles must be provided with drip tray to capture oil, lubricants and hydraulic fluids leakages 3. All vehicle and machinery must be well service to avoid leakages 4. Provide and train on oil spill emergency response 5. Servicing of vehicles and machinery must take place at designate places	-ve	2	2	4	Site Specific	Life of project	R	Low Not Significant	High

Project-Environment Interaction	Description	Mitigation Measures	Impact type	Likelihood occurrence	Severity	Impact Rating	Geographical Extend	Duration	Reversibility (R)	Significance	Confidence Level
Waste Generation	General household pollution and littering such as used oil cans drums, metals, and household solid and liquid waste	1. Provide skip bins to collect waste and be disposed of at an approved disposal site 2. Provide labelled household waste drums for household solid waste. 3. Do not burry waste on site 4. Excavate a small biodegradable waste site that would be dump filled at the end of the project, alternatively, provide mobile toilets that will be disposed at an approved site and ensure separate ablution	-ve	2	2	4	Site Specific	Life of project	R	Low Not Significant	High

Project-Environment Interaction	Description	Mitigation Measures	Impact type	Likelihood occurrence	Severity	Impact Rating	Geographical Extend	Duration	Reversibility (R)	Significance	Confidence Level
		facilities for men and women. 5. Used oil, grease and lubricants cans must be collected in appropriate drums and disposed of at an approved site 6. Maintain good housekeeping on site. 7. Do not burry waste on site									
Noise Pollution	Noise from the aero plane and heavy vehicles	1. The aircraft must fly at heights which may not cause noise nuisance to human and animals 2. A fixed wind air craft is recommended than a	-ve	2	2	4	Local	Immediate	n/a	Low Not Significant	High

Project-Environment Interaction	Description	Mitigation Measures	Impact type	Likelihood occurrence	Severity	Impact Rating	Geographical Extend	Duration	Reversibility (R)	Significance	Confidence Level
		helicopter 3. Heavy vehicles must be well serviced 4. Switch off engine for vehicles when not in use									
Dust Pollution	Land clearing, digging, excavation of trenches, drilling, movement of vehicles and heavy machinery in site, transportation of material to site, will create fugitive dust which could be a nuisance to the surrounding.	1. Movement of heavy vehicles must strictly be restricted on site. 2. Adhere to the minimum speed limit of 30 or 40km/hour when on farm roads. 3. On site where soil is loosened by vehicle movement, apply dust a suppression method such as water spraying.	-ve	2	2	4	Local and Site Specific	Immediate	n/a	Low Not Significant	High

Project-Environment Interaction	Description	Mitigation Measures	Impact type	Likelihood occurrence	Severity	Impact Rating	Geographical Extend	Duration	Reversibility (R)	Significance	Confidence Level
		4. During drilling, use water to suppress the dust									
Land degradation and pollution	Uncoordinated movement of heavy vehicles and uncoordinated land clearing could lead to soil erosion. Possible spill and leakages of fuel and lubricants from vehicle and machinery could pollute the soil and eventually the ground water resource.	1. Movement of heavy vehicles must be coordinated and restricted to be on access roads 2. Normally, public gravel roads are meant for light vehicles, exploration vehicles have the potential to damage the access roads. Hence proper road maintenance must be implemented to ensure that the roads are left on good state 3. Fueling of heavy vehicles on site must be well	-ve	2	2	4	Site Specific	Life of project	n/a	Low Not Significant	High

Project-Environment Interaction	Description	Mitigation Measures	Impact type	Likelihood occurrence	Severity	Impact Rating	Geographical Extend	Duration	Reversibility (R)	Significance	Confidence Level
		coordinated at designated places 4. Servicing of vehicles and machinery must take place at designated sites 5. Stationary vehicles must be provided with drip tray to capture oil, lubricants and hydraulic fluid leakages 6. All vehicles and machinery must be well serviced to avoid leakages 7. Provide and train on oil spill emergency response.									

7 DECOMMISSIONING AND REHABILITATION

The exploration activities do not necessarily yield into a decommissioning phase, but rather a rehabilitation phase. The rehabilitation will include footprints that were created such as, access roads, trenches and drilled holes. Waste dumps with biodegradable materials must be backfilled as well as pit latrine toiled if any. A rehabilitation completion report must be communicated to the Ministry of Environment Forestry and Tourism for approval. The following must be considered for the decommissioning phase.

- The exploration activities must not be abandoned;
- Appoint an Environmental Practitioner to assess the rehabilitation process;
- Ensure that all contaminated materials are properly cleaned before they disposed to approved sites;
- Biodegradable waste site must be dump filled and compacted;
- Pit latrine toiles must be dump filled and compacted;
- No burying of hazardous and non-biodegradable waste is permitted;
- All access roads are rehabilitated;
- All drill holes and trenches should be backfilled filled;
- Ensure the farms owners are satisfied with the rehabilitation;
- Submit the rehabilitation report to the MEFT;

8 CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusion

Generally, exploration activities do not pose significant impact to the social and biophysical environmental. Negligible footprint from access roads, and drilling are not expected to cause irreversible harm to the environment. Shrubs and thick bush may be trimmed to allow line cutting; however the impact of flora and fauna will not be significant. Trenches, drilled holes and access roads are normally fully rehabilitated and always re-vegetated after rainfall season. With adequate implementation of the EMP, the project operation will not have adverse impacts.

The developed mitigation measures has minimised all potential impacts to acceptable low levels. Should the exploration yield a feasibility for a full mining operation, various specialist studies such as Hydrogeology, Vegetation, Cultural, Heritage and Archaeology shall be conducted.

8.2 Recommendations

It is recommended to the approving authority for an issuance of the Environmental Clearance Certificate for the proposed Exploration activities on EPL 7850. To ensure adequate environmental monitoring and performance against project activities, the proponent must undertake bi-annual monitoring and reporting as provided for by the EMA.

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10 APPENDIXES

10.1.1 Appendix 1. EPL Licence and supporting documents

10.1.2 Appendix 2. Newspaper Adverts

10.1.3 Appendix 3. Evidence of public consultations

10.1.4 Appendix 4. Background Information Document

10.1.5 Appendix 5 Environmental Management Plans

10.1.6 Appendix 6. Curriculum vitae of environmental practitioner