

# ENVIRONMENTAL SCOPING REPORT

## Proposed Prospecting and Exploration Activities on EPL 8829, //Kharas Region



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## EXECUTIVE SUMMARY

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An Environmental Scoping Assessment (ESA) has been commissioned by JCN Oil and Energy for the planned prospecting and exploration activities, in //Kharas Region.

Considering the nature of the proposed development and its activities, the ESA has been undertaken in accordance with the requirements of existing national legislations, of which the National Environmental Assessment Policy (1995), the Environmental Management Act (2007) and its regulations of 2012, and other relevant legislations and regulations pertaining to Environmental Assessments and protection of the environment in the Republic of Namibia are considered most important. Some existing international policies are also taken into account and are used as guidelines.

Impacts identified from baseline studies, site visits and stakeholder consultation process have been assessed making use of a comprehensive assessment methodology as provided by the Department of Environmental Affairs (DEA) of Namibia. This included looking at impact significance through, its nature, extent, duration, probability and intensity. Major issues or impacts identified are soil, surface and ground water impacts; air quality (including dust pollution); ecological impacts; hygiene and health impact; heritage impacts; generation of waste; traffic safety; noise pollution; safety and security; and cumulative impacts.

Socio-economic impacts amongst others include creation of part-time and permanent employment opportunities and economic spin-offs for the local businesses and suppliers. Waste generation during the prospecting and exploration activities is eminent; however implementation of proper management strategies should address these issues. Cumulative impacts expected as a result of the planned prospecting and exploration activities include, dust, noise, traffic, waste, habitat disturbance and loss.

In general, impacts are expected to be low to medium, mostly short lived and site specific. Mitigation options recommended in the Environmental Management Plan (EMP) will guide and ensure that the impacts of the prospecting and exploration work are minimised. All environmental risks can be minimised and managed through implementation of preventative measures and sound management systems. Environmental audits should be carried out to ensure compliance of the EMP and environmental regulations of Namibia.

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## GLOSSARY OF TERMS

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**Assessment** - The process of collecting, organising, analysing, interpreting and communicating information relevant to decision making.

**Alternatives** - A possible course of action, in place of another, that would meet the same purpose and need but which would avoid or minimize negative impacts or enhance project benefits. These can include alternative locations/sites, routes, layouts, processes, designs, schedules and/or inputs. The “no-go” alternative constitutes the ‘without project’ option and provides a benchmark against which to evaluate changes; development should result in net benefit to society and should avoid undesirable negative impacts.

**Evaluation** – means the process of ascertaining the relative importance or significance of information, the light of people’s values, preference and judgements in order to make a decision.

**Environment** – Is the complex of natural and anthropogenic factors and elements that are mutually interrelated and affect the ecological equilibrium and the quality of life. As defined in the Environmental Policy and Environmental Management Bill of Namibia - *“land, water and air; all organic and inorganic matter and living organisms as well as biological diversity; the interacting natural systems that include components referred to in sub-paragraphs, the human environment insofar as it represents archaeological, aesthetic, cultural, historic, economic, paleontological or social values”*.

**Environmental Scoping Assessment (ESA)** – process of assessment of the effects of a development on the environment.

**Environmental Management Plan (EMP)** - A legally binding working document, which stipulates environmental and socio-economic mitigation measures that must be implemented by several responsible parties throughout the duration of the proposed project.

**Hazard** - Anything that has the potential to cause damage to life, property and/or the environment. The hazard of a particular material or installation is constant; that is, it would present the same hazard wherever it was present.

**Interested and Affected Party (I&AP)** - any person, group of persons or organization interested in or affected by an activity; and any organ of state that may have jurisdiction over any aspect of the activity.

**Proponent (Applicant)** – means a person who intends or undertakes a project, policy, programme or plan.

**Significant Impact** - means an impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.

**Environmental Clearance Certificate** - This Certificate obtained from the Ministry of Environment and Tourism (Directorate of Environmental Affairs) approving the EIA study and providing clearance to the proponent to initiate work.

## **1. BACKGROUND AND INTRODUCTION**

The proponent, **JCN Oil and Energy**, has obtained a Notice to Grant Exclusive Prospecting Licence over EPL 8829. The minerals of interest are Base and Rare Metals, Industrial Minerals, and Precious Metals. Exploration is a range of activities to help determine if there are minerals under the ground. The EPL holder intends on implementing prospecting and exploration activities in the EPL to identify geological features and lithostratigraphic units within the concession area to define the mineral deposits. The objective of the exploration programme is thus to determine whether these deposits are economically viable. If the exploration process identifies minerals that can be commercially extracted, then mining in the future is possible.

The activities will include both invasive and non-invasive exploration. The proponent will employ a phased exploration approach consisting of three distinct phases i.e. the Pre-Development Phase, Operational Phase, and the Decommissioning and Rehabilitation Phase.

The pre-development phase involves literature and map reviews, as well as fieldwork to determine targets for detailed investigation. The operational and maintenance phase is the phase during which the exploration program will commence. The target areas within the EPLs' boundaries identified during the pre-development phase will undergo rigorous examination. Soil sampling and Reverse Circulation Drilling is the preferred technique for the planned exploration work, and diamond drilling may be considered depending on the outcome of initial operations. A pit may be dug for bulk sampling and the size of the samples may be adjusted depending on the nature of mineralization observed. No explosives will be used during the exploration phase.

FIN Hydro Environmental Technologies was appointed to undertake the Environmental Scoping Assessment of the planned prospecting and exploration activities. This study will enable decision makers to make an informed decision regarding the development and make sure it does not have significant impacts on the environment and that they are mitigated. The environmental Scoping assessment was conducted to comply with Namibia's Environmental Assessment Policy and the Environmental Management Act.

## **2. TERMS OF REFERENCE**

**JCN Oil and Energy** has commissioned an Environmental Scoping Assessment (**ESA**) for the planned prospecting and exploration activities. FIN Hydro Environmental Technologies was appointed to undertake the Environmental Scoping Assessment of the planned prospecting and exploration activities on EPL 8829. This study will enable decision makers to make an informed decision regarding the development and make sure it does not have significant impacts and that they are mitigated. The environmental scoping assessment was conducted to comply with the Environmental Assessment Policy (1995) and the Environmental Management Act (2007) and its regulations of 2012.

## 2.1 Assumptions and Limitations

In undertaking this investigation and compiling the Environmental Scoping Report, the following assumptions and limitations apply:

- Assumes the information provided by the proponent is accurate and discloses all information available.

## 3. ENVIRONMENTAL STUDY REQUIREMENTS

According to the Environmental Management Act no. 7 of 2007, the proponent requires an environmental clearance from the Ministry of Environment and Tourism (Department of Environmental Affairs) to undertake the planned prospecting and exploration activities. The certificate means that the Ministry of Environment and Tourism is satisfied that the activity in question will not have an unduly negative impact on the environment. It may set conditions for the activity to prevent or to minimise harmful impacts on the environment.

The proposed development is listed as a project requiring an environmental assessment as per the following listed activities in the environmental Management Act no 7 of 2007 and its Guidelines (06 February 2012):

**Table 1. List of activities identified in the EIA Regulations that apply to the proposed project**

Activity Description:	Description of Activity	Activities
Activity 3.1 (Mining and Quarrying Activities)	The construction of facilities for any process or activities which requires a licence, right or other form of authorisation, and the renewal of a licence, right or other form of authorisation, in terms of the Minerals (Prospecting and Mining Act), 1992.	The project entails the handling of hazardous substances.
Activity 3.2 (Mining and Quarrying Activities)	Other forms of mining or extraction of any natural resources whether regulated by law or not.	The project entails the prospecting and exploration of mineral resources.
Activity 3.3 (Mining and Quarrying Activities)	Resource extraction, manipulation, conservation and related activities.	The project entails the prospecting and exploration of mineral resources.

#### **4. SCOPE**

The scope of the ESA aims at identifying and evaluating potential environmental impacts emanating from the construction, operations and possible decommissioning of the planned prospecting and exploration activities. Relevant data have been compiled by making use of secondary sources and from project site visits. Potential environmental impacts and associated social impacts will be identified and addressed in this report.

The environmental scoping assessment report aims to address the following:

- a) Identification of potential positive and negative environmental impacts.
- b) Provide sufficient information to determine if the proposed project will result in significant adverse impacts.
- c) Identification of “hotspots” which should be avoided where possible due to the significance of impacts.
- d) Evaluation of the nature and extent of potential environmental impacts
- e) Identify a range of management actions which could mitigate the potential adverse impacts to required levels.
- f) Provide sufficient information to the Ministry of Environment to make an informed decision regarding the proposed project.
- g) Consult relevant stakeholders (i.e. local authority etc.) regarding the proposed development.

#### **5. METHODOLOGY**

The following methods were used to investigate the potential impacts on the social and natural environment due to the proposed prospecting and exploration activities:

- a) Information about the site and its surroundings was obtained from existing secondary information and site visits.

#### **6. LEGAL, POLICY AND INSTITUTIONAL FRAMEWORK**

The ESA process is undertaken in terms of Namibia’s Environmental Management act no. 7 of 2007 and the Environmental Assessment Policy of 1995, which stipulates activities that may have significant impacts on the environment. Listed activities require the authorisation from the Ministry of Environment and Tourism (DEA). Section 32 of the Environmental Management Act requires that an application for an environmental clearance certificate be made for the listed activities. The following environmental legislation is relevant to this project:

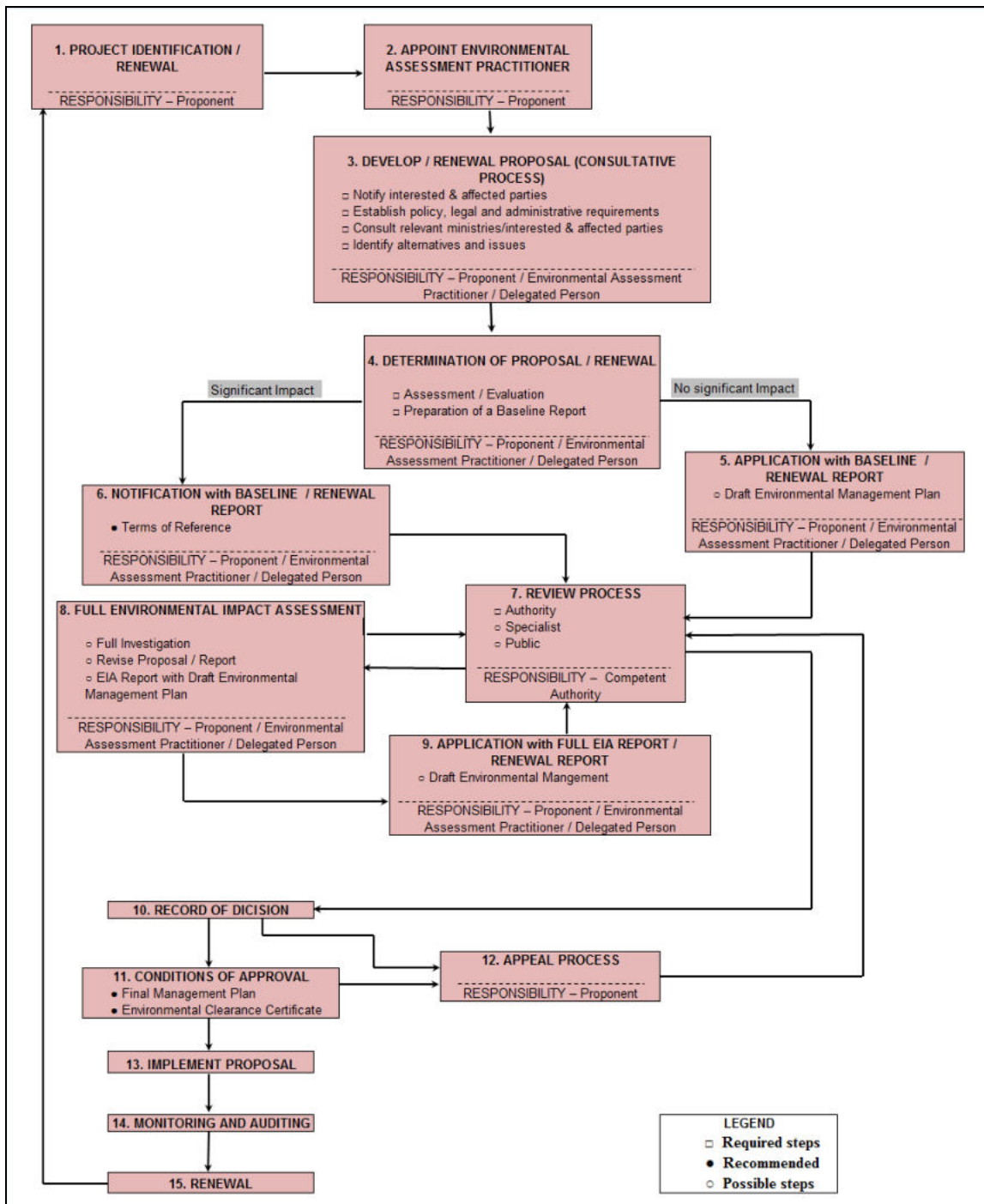


LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
The Constitution of the Republic of Namibia as Amended	<p>Article 91 (c) provides for duty to guard against “the degradation and destruction of ecosystems and failure to protect the beauty and character of Namibia.”</p> <p>Article 95(l) deals with the “maintenance of ecosystems, essential ecological processes and biological diversity” and sustainable use of the country’s natural resources.</p>	Sustainable development should be at the forefront of this development.
Environmental Management Act No. 7 of 2007 (EMA)	<p>Section 2 outlines the objective of the Act and the means to achieve that.</p> <p>Section 3 details the principle of Environmental Management</p>	The development should be informed by the EMA.
EIA Regulations GN 28, 29, and 30 of EMA (2012)	<p>GN 29 Identifies and lists certain activities that cannot be undertaken without an environmental clearance certificate.</p> <p>GN 30 provides the regulations governing the environmental assessment (EA) process.</p>	<p><b>Activity 3.1</b> The construction of facilities for any process or activities which requires a licence, right or other form of authorisation, and the renewal of a licence, right or other form of authorisation, in terms of the Minerals (Prospecting and Mining Act), 1992.</p> <p><b>Activity 3.2</b> Other forms of mining or extraction of any natural resources whether regulated by law or not.</p>

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
		<p><b>Activity 3.3</b> Resource extraction, manipulation, conservation and related activities.</p>
<p>Convention on Biological Diversity (1992)</p>	<p>Article 1 lists the conservation of biological diversity amongst the objectives of the convention.</p>	<p>The project should consider the impact it will have on the biodiversity of the area.</p>
<p>Draft Procedures and Guidelines for conducting EIAs and compiling EMPs (2008)</p>	<p>Part 1, Stage 8 of the guidelines states that if a proposal is likely to affect people, certain guidelines should be considered by the proponent in the scoping process.</p>	<p>The EA process should incorporate the aspects outlined in the guidelines.</p>
<p>Namibia Vision 2030</p>	<p>Vision 2030 states that the solitude, silence and natural beauty that many areas in Namibia provide are becoming sought after commodities and must be regarded as valuable natural assets.</p>	<p>Care should be taken that the development does not lead to the degradation of the natural beauty of the area.</p>
<p>Water Act No. 54 of 1956</p>	<p>Section 23(1) deals with the prohibition of pollution of underground and surface water bodies.</p>	<p>The pollution of water resources should be avoided during construction and operation of the development.</p>
<p>The Ministry of Environment and Tourism (MET) Policy on HIV &amp; AIDS</p>	<p>MET has recently developed a policy on HIV and AIDS. In addition it has also initiated a programme aimed at mainstreaming HIV and gender issues into environmental impact</p>	<p>The proponent and its contractor have to adhere to the guidelines provided to manage the aspects of HIV/AIDS. Experience with construction projects has shown that a significant risk is created when</p>

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
	assessments.	construction workers interact with local communities.
Minerals (Prospecting and Mining) Act 33 of 1992	This Act deals with the granting of access to mineral resources.	Compliance to this instrument is critical.
Labour Act no 11 of 2007	Chapter 2 details the fundamental rights and protections. Chapter 3 deals with the basic conditions of employment.	Given the employment opportunities presented by the development, compliance with the labour law is essential.
Public Health Act no 36 of 1919	Section 119 prohibits persons from causing nuisance.	Owner, contractors and employees have to comply with these legal requirements.
Nature Conservation Ordinance no 4 of 1975	Chapter 6 provides for legislation regarding the protection of indigenous plants	Indigenous and protected plants have to be managed within the legal confines.
Atmospheric Pollution Prevention Ordinance (No. 11 of 1976).	The Ordinance objective is to provide for the prevention of the pollution of the atmosphere, and for matters incidental thereto.	All activities on the site will have to take due consideration of the provisions of this legislation.
Roads Ordinance 17 of 1972	This Ordinance consolidates the laws relating to roads.	The provisions of this legislation have to be taken into consideration in as far as access to the development site is concerned.
Roads Authority Act, 1999	Section 16(5) of this Act places a duty on the Roads Authority to ensure a safe road system.	Some functions of the Roads Ordinance 17 of 1972 have been assigned to the Roads Authority.
Petroleum Products and Energy Act of 1990	This Act regulates the on-site storage of fuel amongst others	The storage of fuel for the use of machinery should adhere to the relevant legislation.

This EIA process will be undertaken in accordance with the EIA Regulations. A Flow Diagram (refer to **Figure 3** below) provides an outline of the EIA process to be followed.



**Figure 1:** EIA flowchart for Namibia (*Environmental Assessment Policy of 1995*)

## 7. BIO-PHYSICAL ENVIRONMENT OF THE STUDY AREA

This section lists the most important environmental characteristics of the study area and provides a statement on the potential environmental impacts on each.

### 8.1 Project Location

The EPL 8829 is located at coordinate position (28.85374°S; 18.20266°E) in the southernmost portion of Karas Region, on Farm Haakiesdoorn 137, approximately 70 km south-west of Warmbad, //Kharas Region. The study area falls within private commercial farmland dominated by topographical higher areas. The EPL is accessible off the D208 road coming from the direction of Karasburg, which passes adjacent the EPL to the east. See Figure 1 below for the locality map of the EPL.

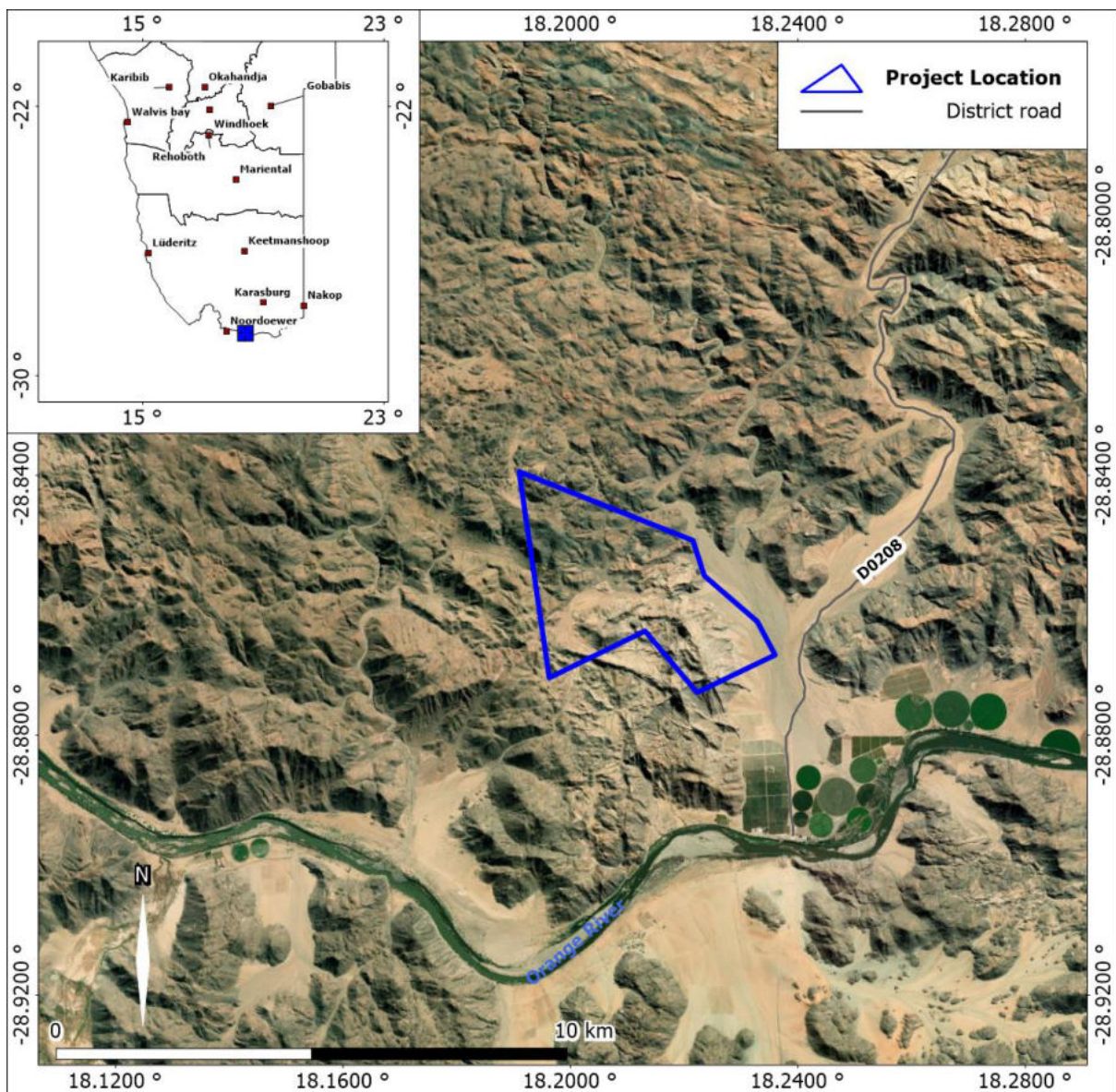


Figure 2. Project location (28.85374°S; 18.20266°E)



**Figure 3. View of the project location**

## **8.2 Topography and Drainage**

The general topography is dominated by corridors of topographical low lying areas created by various ephemeral rivers linked to the Orange River. Land use in the area is dominated mainly by agricultural activities (small stock), with other activities such as tourism and crop farming dominating the area mainly along the Orange River. The site is located within the catchment of the Orange River, a perennial river, draining in a Western direction. This river is located approximately 6km south of the project area.

The relief of significant small dry river courses (streams) running in the area remain relevant, and contribute well to the surface run-off and drainage in the area. These rivers are essential to the local farmers and communities as they support their livelihoods. Care should be taken to avoid contamination of the Orange River and its tributaries in the area, especially during rainy seasons, as water in these bodies is used for aquifer recharge.

### **8.3 Climatic Conditions**

Average rainfall:	Rainfall in the area is averaged between 50 to 100mm per year
Average evaporation:	Evaporation in the area is averaged 3000 to 3200mm per year.
Precipitation:	Sporadic and unpredictable, high intensity, highly localised storm events between October and April does occur.
Water Deficit:	Water deficit in the area is averaged 2100-2300mm per year.
Temperatures:	Highest temperatures are measured in December with an average daily maximum of 33.8°C and minimum of 15.2°C; the coldest temperatures are measured in July with an average daily maximum of 19.6°C and minimum of 2.4°C.
Wind direction:	Predominantly north-northeasterly. Northerly, southwesterly and east-southeasterly airflow is also common.

The aridity of the region causes the water resource to be a scarce commodity and has to be conserved and protected from pollution at all cost.

### **8.4 Geology and Hydrogeology of the Area**

The geology of the area is characterized by the presence of both Palaeo-proterozoic metasedimentary rocks, metavolcanic and granitic intrusive of the Orange River Group and Vioolsdrif Granite Suite. The area is well known for the massive Pegmatite-related mineralizations that have call the interest of mineral exploration companies.

There is a vast existence of mineralizations within the area. Base metals, rare metals, industrial minerals occurrences have been reported and associated to pegmatites. The EPL is located within the Sandfontein-Ramansdrift pegmatite belt with occurrence of Beryllium, Lithium, Tantalum and Tungsten. Next to the EPL area, the Haakiesdoorn Copper (pegmatite-hosted), Stonehouse Copper, Sandfontein-Ramansdrift Feldspar, Sandfontein Ramansdrif Rare Metal Pegmatites occurrences have been identified



Photo 1. Granite outcrops in the EPL area



Photo 2. Typical rock formations in the area

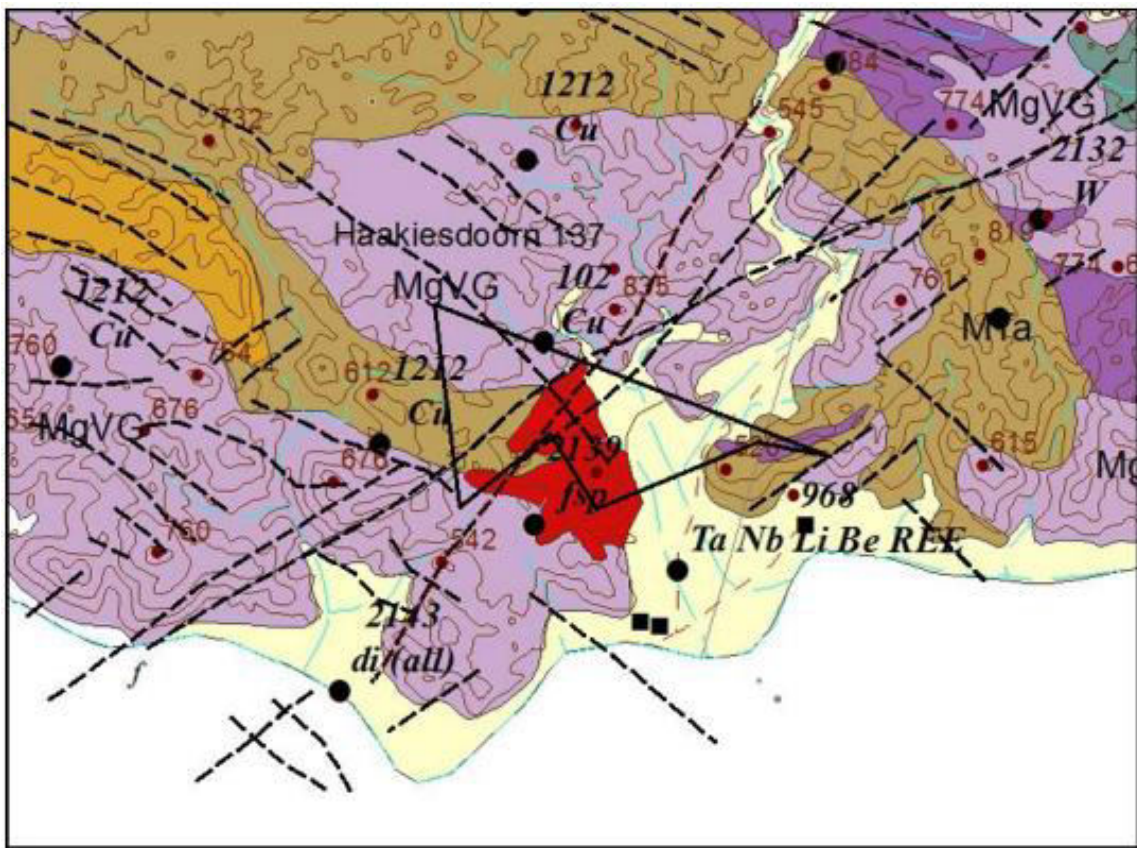
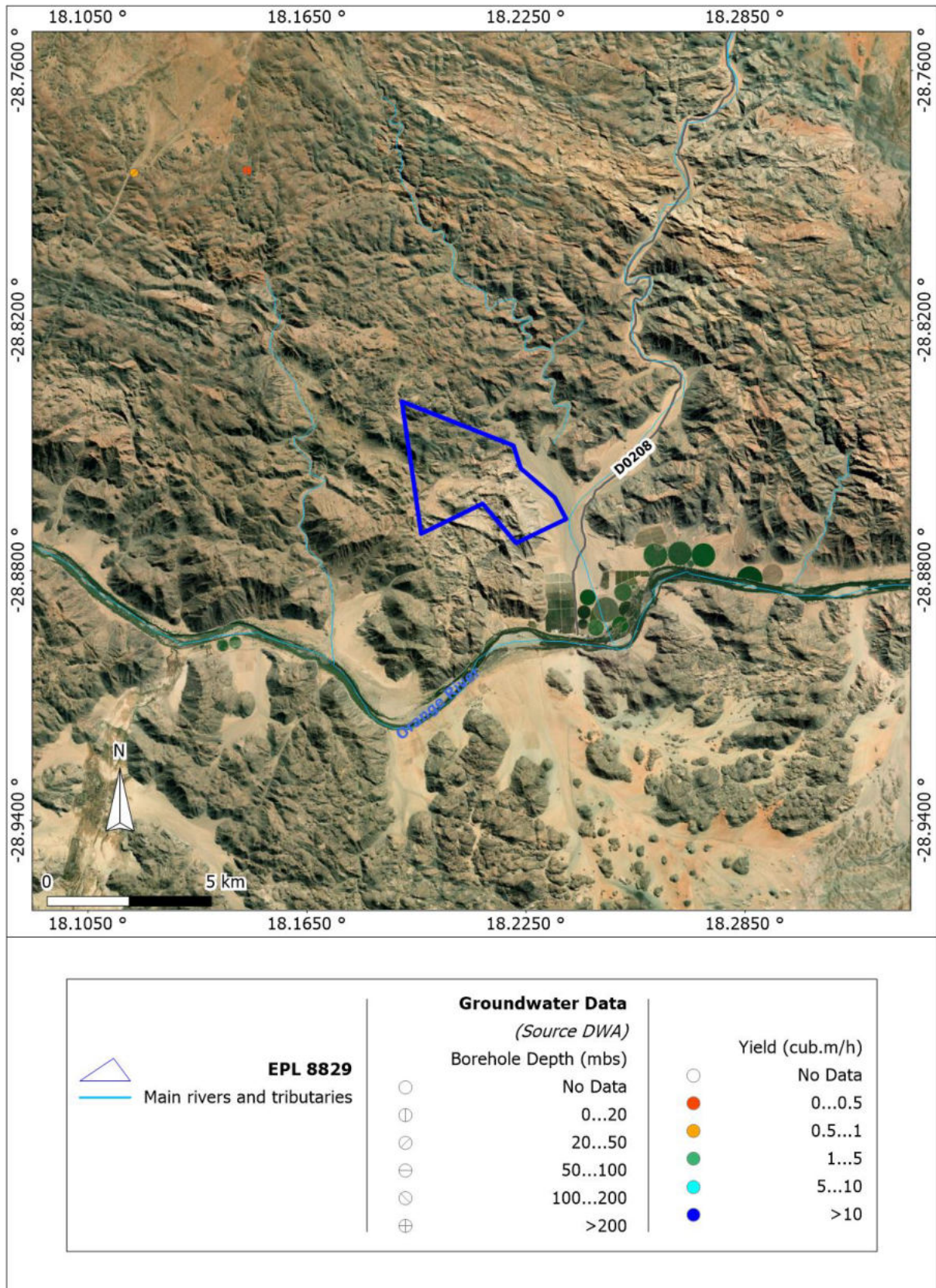


Figure 4. Geology of the area

All of these formations are classified as hard rock formations. Groundwater flow would be mostly along fractures, faults (secondary porosity) and other geological structures



present within the formations. The main structural direction in the area seems to be in a NE-SW direction and in a NW-SE direction.



**Figure 5. Hydrogeology of Area**

Groundwater flow from takes place southward towards the Orange River. According to the Department of Water Affairs (DWA) database, no known boreholes are present within a 7km radius of the project location. See Figure 5 for the hydrogeological map.

#### **8.4.1 Surface-and Groundwater use & users**

The mighty Orange River in the study area has one of the largest river basins in the world with a catchment area that measures approximately 852,000km<sup>2</sup>. It is known as the longest river south of the Zambezi River in the northern Namibia. The river is considered as a vital source of life in the arid southern region of Namibia. The banks of the river are covered in lush vegetation that provides food and homes for a wide variety of wildlife. The river has good fertile banks for cultivation and houses large irrigation schemes that yields agricultural produce for commercial purposes at Haakiesdoorn and other communities in the surrounding. The future of such projects depends on good water management practices within both Namibia and South Africa.

Groundwater and surface water are essentially one resource, physically connected by the hydrologic cycle. Streams interact with groundwater in three basic ways, i.e. streams gain water from inflow of groundwater through the streambed, streams lose water by outflow through the streambed, or they do both depending upon the location along the stream. It is the groundwater contribution that keeps streams flowing between precipitation events. The nearby Orange River is considered to be a significant resource in terms of quantity and of potential downstream water users. As a result, any form of contamination to the Orange River and its tributaries during prospecting and exploration activities should be avoided at all cost.

#### **8.5 General Ecology**

The EPL falls within the Nama Karoo biome, which is characterised by Grassy shrublands type vegetation. The vegetation structure type is classified as Sparse shrubland.

Deducing from the Atlas of Namibia, the proposed site is within the area that is known to have 50 to 100 plant species and a low diversity of higher plants (Mandelsohn et al (2003). It is estimated that at least 54 species of larger trees and shrubs and atleast 49 grasses occur in the general area.

According to RBS (2015), the very high percentage of unique and /or endemic species (52.2%) underscores the importance of the general area for reptiles. Most species e.g. Bushmanland tent tortoise (*Psammobates tentorius veroxii*), Desert mountain adder (*Bitis xeropaga*) are understudied and their importance to the general ecology is not well understood.

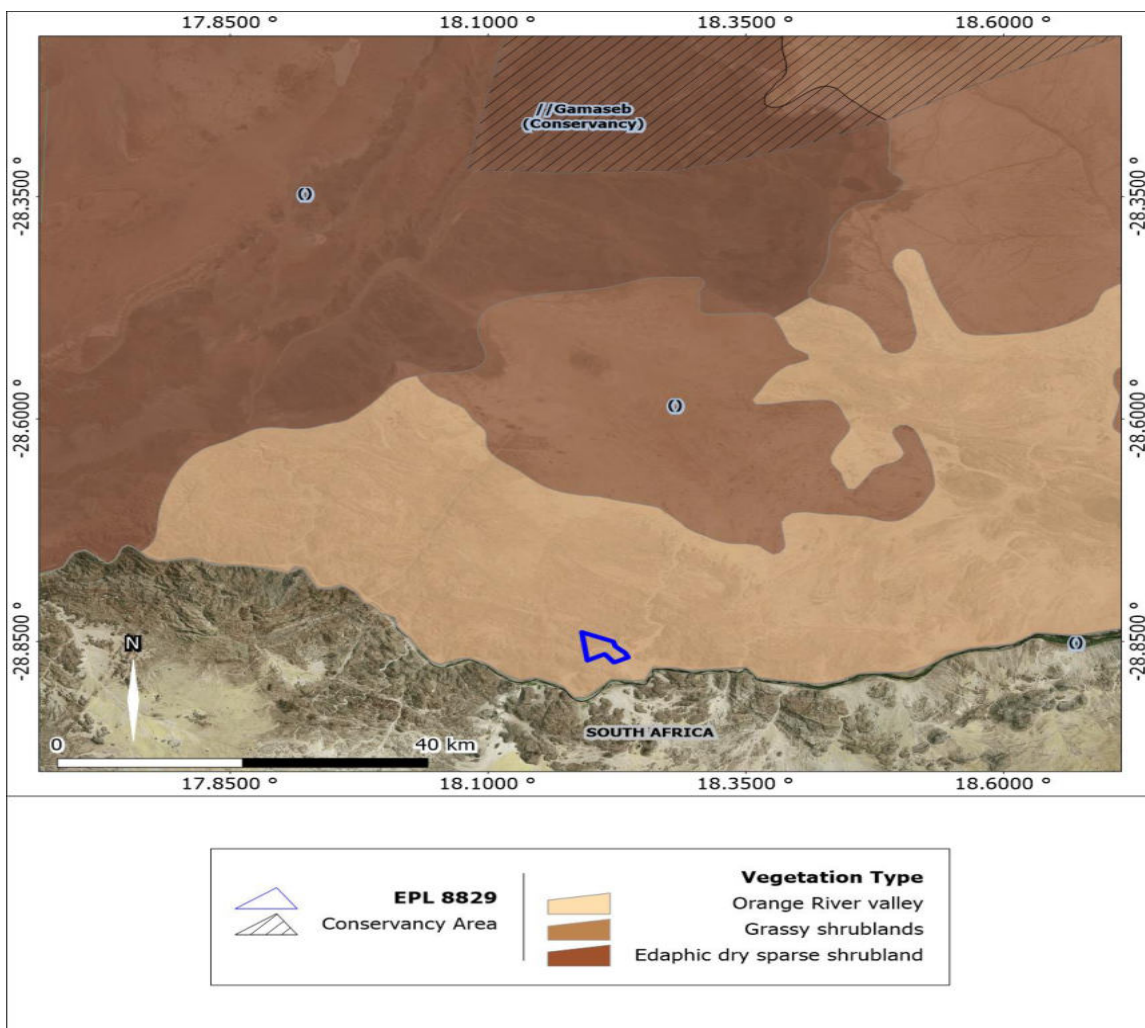
Amphibians are not well represented in the dry southern parts of the country, and their presence in the temporary pools in the ephemeral drainage lines, which potentially

could serve as habitat in the general area, is currently unknown. The Orange River directly south of the EPL area is considered as the most important amphibian habitat in the general area.

Mammals, especially small mammals (rodents and bats) are considered as the most contentious in the proposed exploration areas due to the limited knowledge of their actual habitat preferences and uses as well as their actual utilisation of the greater area. The bat, Namibian wing-gland bat, subspecies of the Littledale’s Whistling Rat, brown hyena, black footed cat and leopard are considered as the most important species. Both hyena and leopard are not expected to occur permanently in the area but rather as vagrants.

The ground nesting Ludwig’s and Kori bustard, which are known to breed in the general area, are viewed as the most important species potentially affected by exploration activities, although not known to What extent they occur in the study area.

Species most likely to be adversely affected by the exploration and /or future mining development would be the variety of reptiles, small mammals and ground nesting birds specifically associated with this area. However, none of the important species are expected to be exclusively associated with the EPL area.



**Figure 6. Vegetation map of study area**

## 8.6 Socio-Economic Setting

This section provides an overview of socio-economic characteristics of the study area. It provides regional and local information on the, economic activities, population dynamics, vulnerability, and social services currently available in the area.

### 8.6.1 Regional information

**Table 2.** Statistics of Karasburg Constituency and Karas Region (NSA, 2011)

<b>KARASBURG CONSTITUENCY</b>	
<b>DISCRIPTION</b>	<b>INDICATOR</b>
Population	16,470
Females	8,402
Males	8,068
Population under 5 years	12%
Population aged 5 to 14 years	18%
Population aged 15 to 59 years	65%
Population aged 60 years and above	6%
Literacy rate of 15 years old and above	97%
People above 15 years who have never attended school	6%
People above 15 years who are currently attending school	7%
People above 15 years who have left school	85%
People aged 15 years and up who belong to the labour force	78%
Population employed	66%
Population unemployed	34%
Homemakers	13%
Students	39%
Retired or old age income recipients	48%
Income from pension	9%
Income from business and non-farming activities	3%
Income from farming	5%
Income from cash remittance	7%
Wages and salaries	72%
<b>KARAS REGION</b>	
Population	77,421
Population under 5 years	11%
Population aged 5 to 14 years	19%
Population 15 to 59 years	63%
Literacy rate of 15 years old and above	97%

### **8.6.2 Economic Activities**

Small stock farming (i.e. while sheep, goat), agriculture and tourism constitute the main economic activities in the area. Farming produce is used locally and also exported to neighbouring countries and overseas. Haakiesdoorn produces some of the most sought after dates in the world

The proposed prospecting and exploration activities is a win-win opportunity for all parties involved, whether they are the land owner, residents, local government, and/or the surrounding communities.

### **8.6.3 Employment Creation (Job Opportunities)**

Unemployment still hampers most of the developing world and //Kharas region is no exception. The proposed development is likely to increase the job opportunities in the region. The Construction phase of the project will provide job opportunities, of which most are expected to be unskilled and semi-skilled people and can be sourced from the unemployed labour force of the local communities and the region at large. The principle of maximising local employment creation can be applied by identifying suitable construction contractors in the region.

The local and regional economies are expected to benefit from the project. Procurement of construction materials, goods and services would have beneficial downstream economic impacts by stimulating demand up the supply chain. Contractors should employ local labour by recruiting from local communities.

### **8.6.4 Livelihoods**

Formal employment with wages and salaries is the main source of income for 72% of households in the Karas Constituency. Farming (5%), Non-farming businesses (5%), cash remittance (7%) and pensions (9%) constitute the main source of income for the remaining households in the constituency. The livelihoods of the local communities are likely to be positively impacted therefore predicted to be better than before the proposed exploration in the area.

### **8.6.5 Tourism**

Private game farms and conservancies in //Kharas Region offer protection to wildlife which then becomes an attraction to tourists and trophy hunters, in turn providing farm owners with alternate livelihoods as well as sources of income from game farming, hunting and ecotourism.

The project area attracts a lot of tourists from all over the world, hence negative impacts can have negative impacts on the tourism industry in the area.

#### **8.6.6 In - Migration**

Due to enhanced employment opportunities that could be created by the envisaged project, some in-migration of job seekers to the area can be expected. This has potential to grow the area positively, however it can also encourage adverse impacts such as overcrowding, poaching, theft etc. Mitigation scenarios and management thereof must be well developed and enforced.

#### **8.6.7 Infrastructure & Increased Traffic**

The D0208 gravel roads connects EPL 8829 to the B1 national road network. The EPL area is accessed from the D0208 or via the Orange River. The traffic in the area is expected to increase slightly during prospecting and exploration activities in the area.

## **8. STAKEHOLDER CONSULTATION**

As per the requirements of the EIA Regulations (Section 21) a call for public consultation with all I&APs during the EIA process is required. This entails consultation with members of the public and providing them an opportunity to comment on the proposed project. Stakeholder consultation forms an integral component of an ESA investigation and enables comments on the potential environmental impacts associated with the proposed development and to identify additional issues which they feel should be addressed in the ESA.

Decision-making authorities were consulted during the study, and have been engaged throughout the project process. Consultation with the department of Environmental Affairs (MET) included the environmental assessment procedure and application procedure.

A background information document (see Annexure C) was availed to all stakeholders who were consulted and raised no environmental or social concerns regarding the development. See comments received from I&APs in Annexure C.

## **9. POTENTIAL IMPACTS**

This Chapter describes the potential impacts on the biophysical and socio-economic environments, which may occur due to the proposed activities. These include potential impacts which may arise during the planning and design phase, potential construction related impacts (i.e. short to medium term) as well as the operational impacts of the proposed development (i.e. long-term impacts).

The assessment of potential impacts will help to inform and confirm the selection of the preferred project plan and design to be submitted to MET and MME for consideration. Their decision on the environmental acceptability of the proposed project and the setting of conditions of authorisation, should the project be authorised, will be informed by this chapter amongst other information contained in this EA Report.

The baseline and potential impacts that could result from the proposed development are described and assessed with potential mitigation measures recommended. Finally, comment is provided on the potential cumulative impacts which could result should this development, and others like it in the area, be approved.

### **9.1 PLANNING AND DESIGN PHASE**

During the planning and design phase consideration is given to aspects such as surface and groundwater; fauna and flora; infrastructure; access road, traffic, and landowners.

#### **9.1.1 Compliance Requirements**

The planned prospecting and exploration is listed as a project requiring an environmental assessment as per the listed activities in the National environmental requirements. Conduct an environmental scoping and management plan to comply with the Environmental Management Act (2007) and its regulations of 2012. Identify and address all environmental and social issues. The proposed activities will take place at on EPL 8829. No resettlement of people or communities is expected for the proposed development.

#### **9.1.2 Public Consultation**

Consultation with the public forms an integral component of an environmental impact assessment. Initiate participation of Interested and affected parties (I&APs) and develop a database of all stakeholders and I&APs. Inform I&APs and key stakeholders about the proposed development. Identify issues and concerns of key stakeholders and I&APs with regards to the proposed development. Develop a communication structure with stakeholder and I&APs.

### **9.1.3 Environmental Awareness**

Ensure that all persons involved in the project are aware of, and are familiar with the environmental requirements for the project. Develop and implement environmental emergency preparedness procedures.

### **9.1.4 Health and Safety Aspects**

Ensure that all persons involved in the project are aware of, and are familiar with the environmental requirements for the project. Establish personnel protection standards and mandatory safety practices and procedures for the field activities related to Corrective Actions at the site. Establish the lines of communication among contractors and subcontractors involved in work operations for safety and health matters.

Conduct HIV /Aids Awareness Programme on Site for not less than 90% of workers inclusive of all direct and indirect costs. Provide and maintain condom dispenser. Provide and maintain HIV/AIDS awareness posters. Provide information regarding the voluntary testing of construction workers and counselling, support and care.

## **9.2 OPERATIONAL PHASE**

During the construction phase the following potential impacts have been identified: fauna and flora; pressure on the infrastructure; surface and ground water; health, safety and security impacts; air quality; noise, traffic; solid waste management; hazardous substances; and social impact.

### **9.2.1 Fauna and Flora**

While some of the vegetation (mainly weedy species and bushes) may have to be cleared or removed for exploration activities, it is recommended that, where feasible, trees found at the project area should be kept and maintained as far as possible. The trees that are to be kept should be clearly marked with “danger tape” or a similar marker to prevent accidental removal, regular inspection of the marking tool should be carried out. The very important trees should be “camped off” to prevent the unintended removal or damage.

### **9.2.2 Pressure on Infrastructure**

During the prospecting and exploration phase there will be an additional demand for basic services such as water, electricity and sewer. The services will be used for both human consumption and for exploration purposes. The risk of stress on the resource, wastage and pollution may occur if no proper management actions are implemented.

### **9.2.3 Surface and Ground Water**

Surface and ground water impacts may be encountered during the prospecting and exploration phase, especially if exploration takes place during the rainy season. The risk



of contaminating such water sources can be increased by spillage and leakages of oils and fuels and any other equipment used during construction; chemical contamination from construction materials such as cement, paint and mechanical fluids.

#### **9.2.4 Health, Safety and Security**

Due to a high demand of prospecting and exploration workers during this phase of the project, the deployment of a temporary workforce may be necessary. These types of projects, where prospecting and exploration contractors / workers have the opportunity to interact with the local community, create a significant risk for the development of social conditions and behaviours that contribute to the spread of conditions such as HIV and AIDS. The Ministry of Environment and Tourism has thus initiated a programme aimed at mainstreaming HIV and gender issues into environmental impact assessments.

#### **9.2.5 Air Quality**

During the prospecting and exploration phase fugitive dust and exhaust gases generated have a potential impact on the air quality of the area and its surroundings. Dust is a major component of air pollution and could negatively affect the health of nearby communities if not mitigated. Dust is generated mainly from the following activities:

- Excavations, drilling and clearing of exploration areas;
- Use of heavy vehicles, machinery and equipment;
- Procurement and transport of materials to the site.

These are however short-term impacts limited to the prospecting and exploration phase of the project.

#### **9.2.6 Noise**

Noise is perceived as one of the most undesirable consequences of prospecting and exploration activities. The prospecting and exploration for minerals will result in associated noise impacts. These noise impacts will mainly be associated with exploration machinery, vehicles and equipment. Given that the land use in the area is farming, agriculture and tourism, the inhabitants will be impacted. The impact is however limited to the prospecting and exploration period only.

#### **9.2.7 Traffic**

Traffic is expected to increase during the prospecting and exploration phase of the project. A number of trucks, vehicles, equipment and other heavy machinery will be utilised during this phase. Not only will the increase in traffic result in associated noise impacts, it will also impact on the vehicular traffic in the area, in particular along the D0208 road. The safety of road users needs to be considered. The use of slow moving heavy trucks has the potential to cause traffic jams.

### **9.2.8 Solid Waste Management**

The prospecting and exploration activities will likely generate a reasonable amount of solid waste. An adequate number of refuse receptacles should be placed at strategic location at the project site as well as the workers' camp for the collection of waste, which should be emptied frequently and taken to the designated landfill site. These receptacles should be of a type that can be closed to prevent scavenging by birds and animals.

Oils, lubricant etc. will be separately collected and reused where feasible or else removed from site to be recycled.

### **9.2.9 Storage and Utilisation of Hazardous Substances**

Hazardous substances are regarded by the Hazardous Substance Ordinance (No. 14 of 1974) as those substances which may cause injury or ill-health to or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitizing or flammable nature or the generation of pressure in certain circumstances. It covers manufacture, sale, use, disposal and dumping as well as import and export. During the prospecting and exploration period, the on-site use and storage of these types of hazardous substances, such as oils, lubricants, curing compounds, types of solvents, primers, adhesives and diesel, could have a negative impact on the surrounding environment, if these substances spill and enter the environment.

### **9.3.10 Quality of Life**

The proposed prospecting and exploration will serve as an important economic activity that provides jobs. This will have a positive impact on the quality of life of the workers in terms of household incomes, but also the contribution to the regional economy and Gross Domestic Product of the country.

### **9.3.11 Visual and Sense of Place**

The prospecting and exploration activities may be visually prominent from some angles and could thus have an impact on the sense of place of the local community. Lighting at night could be disturbing to the neighbouring communities and fauna.

### **9.2.10 Social Impacts**

Poaching of wildlife, stock theft, alcohol and drug smuggling are some of the risks posed by the deployment of prospecting and exploration workforce. Control of the movement of these workers is imperative to avoid a negative impact in the local community.

## 9.4 CLOSURE AND REHABILITATION

Numerous exploration projects in the country have been abandoned, leaving the government to take over liability for rehabilitation often after substantial environmental damage has been done. It is therefore critical that prospecting and exploration companies engage in closure planning as early as possible in their planning stages.

The Chamber of Mines of Namibia has developed the Namibian Mine Closure Framework that provides minimum standards and guidance for mining companies to come up with relevant and practical closure plans. The framework addresses the need to:

- ✓ conform to current legislative requirements
- ✓ consult with a variety of stakeholders to derive a widely acceptable social, economic and environmental closure outcome
- ✓ develop an optimal closure strategy based on envisaged and agreed final post-mining social and environmental conditions
- ✓ develop a plan of practical closure actions, incorporating the optimal strategy
- ✓ provide all the necessary financial, knowledge and skills resources at implementation of the closure plan
- ✓ have a formal relinquishment process in place releasing the mining company from future obligations when closure outcomes have been accepted and achieved.
- ✓ A National Environment Restoration Fund is being proposed in the Amendments to the Environmental Management Act of 2007. The proponent is advised to contribute to such pre or post establishment.

## 10. ENVIRONMENTAL IMPACT EVALUATION

The Environmental Scoping Assessment sets out potential positive and negative environmental impacts associated with the proposed development. The following assessment methodology will be used to examine each impact identified, see Table 4.

**Table 3. Impact Evaluation Criterion (DEAT 2006)**

Criteria	Rating (Severity)	
Impact Type	+VE	Positive
	0	No Impact
	-VE	Negative
Significance of impact being either	L	Low (Little or no impact)
	M	Medium (Manageable impacts).
	H	High (Adverse impact).

<b>Probability:</b>	<b>Duration:</b>
5 - Definite/don't know	5 - Permanent
4 - Highly probable	4 - Long-term (impact ceases)
3 - Medium probability	3 - Medium-term (5-15 years)
2 - Low probability	2 - Short-term (0-5 years)
1 - Improbable	1 - Immediate
0 - None	
<b>Scale:</b>	<b>Magnitude:</b>
5 - International	10 - Very high/don't know
4 - National	8 - High
3 - Regional	6 - Moderate
2 - Local	4 - Low
1 - Site only	2 - Minor
	0 - None

For each impact, the EXTENT (spatial scale), MAGNITUDE (size or degree scale) and DURATION (time scale) are described. These criteria are used to ascertain the SIGNIFICANCE of the impact. The decision as to which combination of alternatives and mitigation measures to apply lies with the proponent, and their acceptance and approval ultimately with the relevant environmental authority.

The SIGNIFICANCE of an impact is derived by taking into account the temporal and spatial scales and magnitude. Such significance is also informed by the context of the impact, i.e. the character and identity of the receptor of the impact.

## **10.1 Operational Phase**

### **10.1.1 Dust Pollution and Air Quality**

Dust will be generated during the prospecting and exploration phase and might be worse during the winter months when strong winds occur. Dust problems are expected to be site specific and may pose a slight nuisance to the neighbouring farms and the D0208 road users. Dust is regarded as a nuisance as it reduces visibility and affects the human health. Excessive air pollution in the form of emissions from prospecting and exploration vehicles and equipment may also deteriorate air quality in the area.

#### **Proposed Mitigation Measures**

- ✚ Use appropriate dust suppression measures when dust generation is unavoidable, e.g. dampening with water, particularly during prolonged periods of dry weather.
- ✚ Prospecting and exploration vehicles to only use designated roads.
- ✚ During high wind conditions the exploration contractor must make the decision to cease works until the wind has calmed down.
- ✚ Cover any stockpiles with plastic to minimise windblown dust.
- ✚ Provide workers with dust masks.
- ✚ Ensure construction vehicles are well maintained to prevent excessive emission of smoke.

- ✚ Ensure all vehicle, plant and equipment are in good condition.
- ✚ Encourage reduction of engine idling.

Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Dust	-VE	1	2	6	3	L	L

### 10.1.2 Noise Impact

Noise pollution due to exploration vehicles, equipment and machinery will be generated. An increase of ambient noise levels at the exploration site is expected. Noise generated may impact neighbouring communities and fauna.

#### Proposed Mitigation Measures

- ✚ Inform neighbouring farms and communities of prospecting and exploration activities to commence and provide for continuous communication between the farmers and communities; and contractor(s).
- ✚ Limit construction times to acceptable daylight hours.
- ✚ Install technology such as silencers on construction machinery.
- ✚ Do not allow the use of horns as a general communication tool, but use it only where necessary as a safety measure.
- ✚ Ensure proper maintenance is conducted on vehicles to ensure the reduction of noise emission.
- ✚ The workers should be equipped with ear protection equipment.
- ✚ Audio equipment (if any) should not be played at levels considered intrusive by others.

Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Noise	-VE	1	1	4	3	L	L

### 10.1.3 Safety & Security

Safety issues could arise from the prospecting and exploration vehicles, earthmoving equipment and tools that will be used at the project site. This increases the possibility of injuries and the contractor must ensure that all staff members are made aware of the potential risks of injuries on site. Exploration and camp sites usually house material and equipment which may attract criminal activities.

#### Proposed Mitigation Measures

- ✚ Provide suitable emergency and safety signage on site (manufactured of durable, weatherproof material). The signage signs should be placed at strategic locations to ensure awareness.
- ✚ Demarcate and barricade any areas which may pose a safety risk (including hazardous substances, deep excavations etc). These notices must be worded in English and the local language.

- ✚ Enforce the use of appropriate Personal Protective Equipment (PPE) for the right task or duties at all times.
- ✚ Prevent illegal access to the exploration sites by implementing appropriate security measures.
- ✚ Equipment housed at the project site must be placed in a way that does not encourage criminal activities.
- ✚ Sensitize operators of exploration earthmoving, machinery equipment and tools to switch off engines of vehicles or machinery not being used.
- ✚ The contractor is advised to ensure that the team is equipped with first aid kits and that they are available on site, at all times.
- ✚ Adequate lighting within and around the exploration site should be erected, when visibility becomes an issue.

Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Safety & Security	-VE	1	1	4	2	M	L

#### 10.1.4 Traffic

Prospecting and exploration vehicles will access the project site from the D0208 road. A slight nuisance might be experienced by motorists using this road. This will most likely be caused by slow moving vehicles frequenting the exploration site.

##### Proposed Mitigation Measures

- ✚ Install and maintain official traffic signalling (where necessary) along the D0208 road.
- ✚ Speed limit must be adhered to, to minimise accidents.
- ✚ Prospecting and exploration vehicles and machinery must be tagged with reflective signs or tapes to maximise visibility and avoid accidents.
- ✚ Exploration vehicles should not be allowed to obstruct the road, hence no stopping in the road, wholly or partially, but rather pull off the road or park on the roadside.

Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Traffic	-VE	1	2	2	2	L	L

#### 10.1.5 Groundwater

Groundwater quality could be impacted through leachate of petroleum, chemical, harmful and hazardous substances. In particular, oil leakages, diesel, lubricants and grease from vehicles, equipment and machinery utilised during the prospecting and exploration phase may occur. Care must be taken to avoid contamination of soil and groundwater.

**Proposed Mitigation Measures**

- ✚ Prevent spillages of any chemicals and petroleum products (i.e. oils, lubricants, petrol and diesel). Use drip trays, linings or concrete floors when evidence of leaks are observed on vehicles or equipment.
- ✚ All fuelling, storage and chemical handling should be conducted on surfaces provided for this purpose. Drip trays, linings or concrete floors must be used when removing oil from machinery.
- ✚ Spillage control procedures must be in place according to relevant SANS standards or better. Waste water collection systems should be connected to these systems.
- ✚ Portable ablution facilities will be installed, hence adequate containment systems should be erected for these facilities.
- ✚ Waste should properly be contained to avoid any leakages and/or spillages, and should regularly be disposed off at a suitable sewage disposal site. Run-off from these toilets due to overflows should be avoided at all cost.
- ✚ Proper environmental awareness and remedial response training of operators must be conducted on a regular basis.

Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Groundwater	-VE	2	2	4	2	M	L

**10.1.6 Surface Water**

Local drainage is well developed and run-off takes place to the south. The relief of significant small dry river courses (streams) running in the area remain relevant, and contribute well to the drainage of surface run-off in the area. Contaminants in the form of oil leakages, diesel, lubricants and grease from equipment and machinery may occur during the prospecting and exploration phase.

**Proposed Mitigation Measures**

- ✚ Use drip trays, linings or concrete floors when evidence of leaks are observed on exploration vehicles or equipment.
- ✚ Any spillage of hazardous substances including fuel, oil, paint or cleaning solvent must be cleaned up immediately, stored and disposed off at a designated disposal facility.
- ✚ Prevent discharge of any pollutants, such as chemicals, and hydrocarbons into the nearby water ways and courses.
- ✚ Properly secure all portable toilets (if any) to the ground to prevent them toppling due to wind or any other cause.
- ✚ Ensure that no spillages occur when the toilets are cleaned or emptied. Prohibit urination on site, other than at designated facilities.

- ✚ Stabilise cleared areas as soon as possible to prevent and control surface erosion.
- ✚ Proper environmental awareness and remedial response training of operators must be conducted on a regular basis.
- ✚ An emergency plan should be in place on how to deal with spillages and leakages during this phase.

Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Surface water	-VE	2	2	4	2	M	L

### 10.1.7 Generation of Waste

Waste material will be generated during the prospecting and exploration activities. Waste in the form of rock cuttings, pipe cuttings, electrical cuttings, oil spills or leakages of petroleum products might occur during the exploration phase.

#### Proposed Mitigation Measures

- ✚ Ensure that sufficient weather- and vermin- proof bins / containers are present on site for the disposal of solid waste. Waste and litter generated during this phase must be placed in these disposal bins.
- ✚ The Contractor shall institute a waste control and removal system for the site.
- ✚ No disposal of /or burying of waste on site should be conducted. No waste should be burned on site.
- ✚ Hazardous waste storage is to be clearly marked to indicate the presence of hazardous substances, and the protocols associated with handling of such hazardous wastes shall be known by all relevant staff members.
- ✚ Regular inspection and housekeeping procedure monitoring should be maintained at all times.
- ✚ Awareness of the hazardous nature of various types of waste should be enforced.

Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Waste Generation	-VE	1	2	6	4	M	L

### 10.1.8 Heritage Impacts

There are no known heritage areas envisaged to be impacted by the development; however the contractor might come across archaeological features or objects that possess cultural values during exploration activities.

#### Proposed Mitigation Measures

- ✚ If such remains or objects with cultural values (e.g. bones, weapons, ancient cutlery, graves etc) are uncovered at the project location or surrounding, it should be barricaded off, and



- The relevant authorities (i.e. the local police and National Heritage Council of Namibia) should be contacted immediately.

Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Heritage	-VE	1	1	2	2	L	L

### 10.1.19 Ecological Impacts

The project area is free of sensitive flora and fauna. While some of the vegetation (mainly weedy species and bushes) may have to be cleared or removed for exploration activities.

#### Proposed Mitigation Measures

- Where feasible, trees found at the project area should be kept and maintained as far as possible.
- Disturbance of areas outside the designated working zone is not allowed.
- No vegetation should be removed outside the designated project area.

Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Ecology	-VE	1	1	2	2	L	L

### 10.1.10 Socio-Economic Aspects

Employment opportunities are anticipated to be created during the exploration, both directly through employment of workers and indirectly through suppliers and service providers to the project site.

#### Proposed Mitigation Measures

- The exploration contractor should be sourced from the area, or region at large (where feasible).
- The exploration workers should be sourced from the area, or region at large (where feasible).
- Suppliers of exploration materials should be sourced from the area, or region at large (where feasible).
- Locally source services required during the exploration process, such as securities, rental of portable toilets, plant hire, etc.

Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Socio-economic	-VE	1	1	6	4	L	L

#### *Summary of all potential impacts during the prospecting and exploration phase:*

In general, impacts are expected to be low to medium, mostly short lived and site specific. Mitigation options recommended in the Environmental Management Plan

(EMP) will guide and ensure that the impacts of the prospecting and exploration activities are minimised.

The appointed contractor should be made aware of the content and environmental

#### 10.4 Decommissioning Phase

Develop a closure plan within first 12 months of operation. Closure plan to address issues as per the Namibian Mine Closure Framework (See 10.4 above). The Environmental Management Plan for this phase will have to be reviewed at the time of decommissioning to cater for changes made to the project.

### 11.CUMMULATIVE IMPACTS

Possible cumulative impacts associated with the construction phase include an increase in traffic visiting the site. An increase in emissions from these vehicles will be experienced, decreasing the air quality in the area. Wear and tear on the roads could be expected, coupled with increased risks of road traffic incidences.

Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Cummulative impacts	-VE	2	2	6	2	L	L

### 12.ENVIRONMENTAL MANAGEMENT PLAN

The Environmental Management Plan (EMP) provides management options to ensure impacts of the proposed development are minimised. An EMP is an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented, and the positive benefits of the projects are enhanced.

The objectives of the EMP are:

- ✓ to include all components of the development;
- ✓ to prescribe the best practicable control methods to lessen the environmental impacts associated with the construction of the development;
- ✓ to monitor and audit the performance of construction personnel in applying such controls; and
- ✓ to ensure that appropriate environmental training is provided to responsible construction personnel.

The EMP acts as a stand-alone document, which can be used during the prospecting and exploration phase. All contractors taking part in the project should be made aware of the contents of the EMP. The EMP is attached as Annexure E.

### **13. CONCLUSIONS**

In general, the planned prospecting and exploration activities would pose limited environmental and social risks.

All environmental risks can be minimised and managed through implementing preventative measures and sound management systems. It is recommended that this information be made available to the relevant authorities and stakeholders on a regular basis. The Environmental Management Plan should be used as an on-site tool during this project. Future environmental audits should be carried out to ensure compliance of the EMP and environmental regulations of Namibia. Parties responsible for non-conformances of the EMP will be held responsible for any rehabilitation that may need to be undertaken.

The environmental clearance is valid for 3 years only, as per the environmental management act No.7 of 2007, thus it is the responsibility of the proponent to commission an application for renewal of the permit by submitting an updated ESA/EMP document before it expires.

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