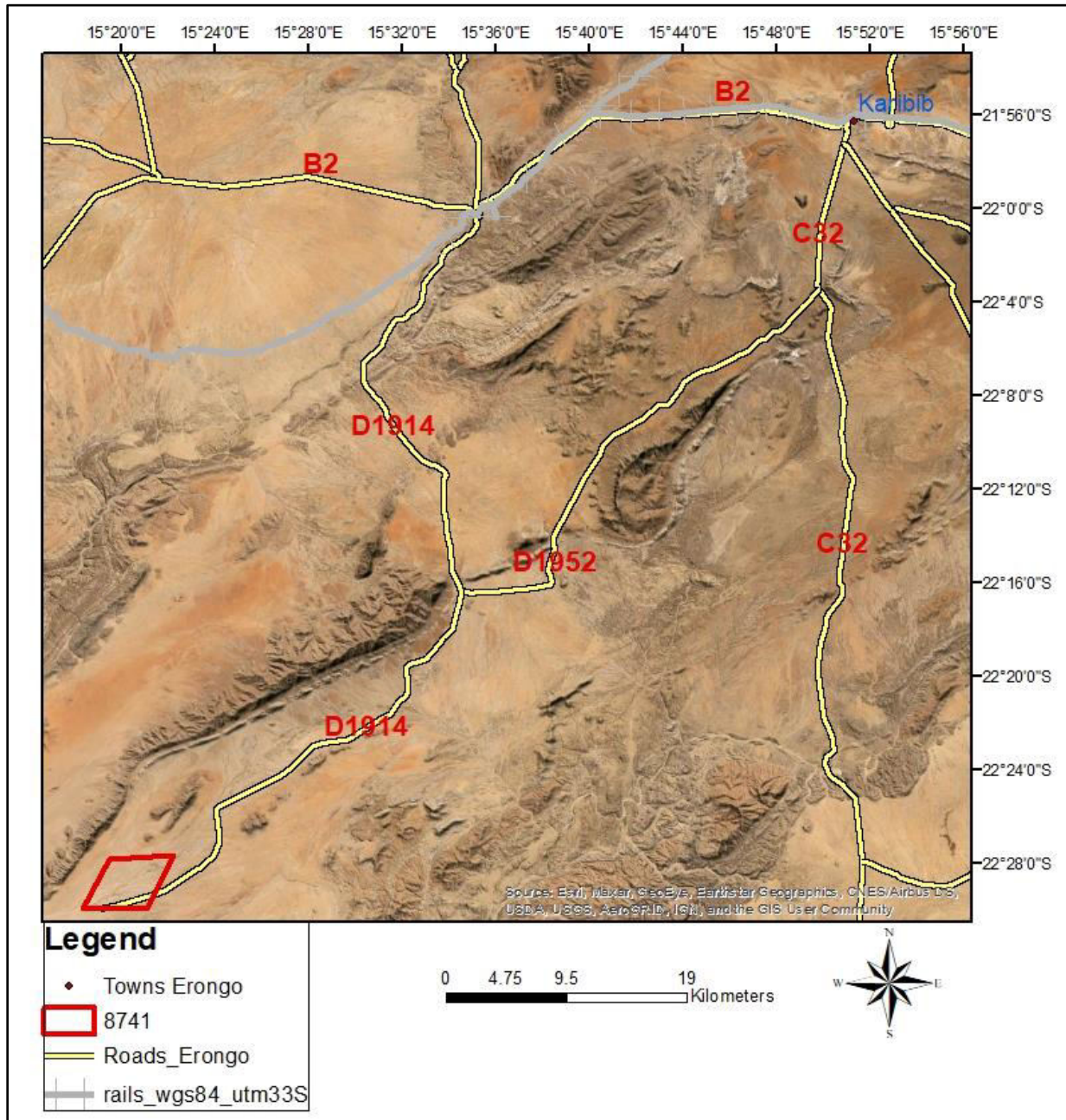


**AN ENVIRONMENTAL IMPACT ASSESSMENT REPORT ON THE PROPOSED  
MINERAL EXPLORATION ON EPL 8741 IN KARIBIB DISTRICT, ERONGO  
REGION**



**Prepared by:**


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**Zhongan Investments (Pty) Ltd**  
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## DOCUMENT DATA SHEET

<b>Title</b>	<b>AN ENVIRONMENTAL IMPACT ASSESSMENT REPORT ON THE PROPOSED MINERAL EXPLORATION ON EPL 8741 IN KARIBIB DISTRICT, ERONGO REGION</b>		
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## **EXECUTIVE SUMMARY**

Zhongan Investments (Pty) Ltd hereinafter referred to as the Proponent intends to carry out mineral prospecting activities on exclusive prospecting licence (EPL) 8741. Mineral rights valid under this EPL are Base & Rare metals, Dimension Stone, Industrial Minerals, Non-Nuclear Fuels, Nuclear fuels and Precious Metals. The Exclusive Prospecting Licence 8741 situated approximately 90 km by road south-southwest of the town of Karibib, in Erongo Region and the size of the project area is 1892.2808 Hectares. The area falls under the Karibib Constituency and covers the farms Vlakteplaas 110, Vlakteplaas 110 Portion No. 1 and Bloemhof 109. Zhongan Investments (Pty) Ltd appointed Minera-Xplore Consultancy CC to conduct the Environmental Impact Assessment for the proposed mineral exploration on the EPL.

The Environmental Regulations procedure (GN 30 of 2012) stipulates that no exploration activities may be undertaken without an environmental clearance certificate. As such, an environmental clearance certificate must be applied for in accordance with regulation 6 of the 2012 environmental regulations. It is imperative that the proponent must conduct a public consultation process in accordance with regulation 21 of the 2012 environmental procedure, produce an environmental assessment report and submit an Environmental Management Plan for the proposed exploration activities. In alignment with the Environmental Act and the 2012 environmental regulations, Zhongan Investments (Pty) Ltd appointed Minera-Xplore Consultancy CC to conduct the Environmental Impact Assessment for the proposed mineral exploration on EPL 8741.

The Proponent (Zhongan Investments) intends to carryout exploration activities on EPL8741 for Base & Rare metals, Dimension Stone, Industrial Minerals, Non-Nuclear Fuels, Nuclear fuels and Precious Metals. The proposed exploration activities include desktop studies, geophysical surveys, geochemical survey, geological mapping, trenching, drilling and geochemical sampling as well as laboratory analysis aimed discovering mineral resources of economic interest. The goal of exploration is to discover economically viable mineral deposits. This project has the potential to contribute to Namibia's economy both directly and indirectly through taxes and royalties, employment creation and socio-economic development, hence the need for this project. Potential

positive and negative impacts of the proposed exploration activities on the EPL 8741 were identified, assessed, and mitigation measures are provided in the EMP. These mitigation measures and recommendations provided are deemed sufficient to minimize the identified impacts to acceptable levels. This is to ensure that all potential impacts identified in this study and other impacts that might arise during the exploration activities are properly addressed on time. The project area is not pristine, it already hosts other authorized mining activities such as dimension stone mining a, therefore the natural setting of the area is accustomed to similar operations and that potential negative impact of the proposed project on the natural environment of the surrounding area will be negligible. The proposed project will strictly employ locals from nearby towns and settlements.

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## ACRONYMS AND ABBREVIATIONS

Below a list of acronyms and abbreviations used in this report.

<b>Acronyms / Abbreviations</b>	<b>Definition</b>
EPL	Exclusive Prospecting License
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
MEFT	Ministry of Environment, Forestry and Tourism
MEFT: DEA	Ministry of Environment, Forestry and Tourism: Department of Environmental Affairs
MME	Ministry of Mines and Energy
Target area	The area covered by the EPL 8741

# **1. Introduction**

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## **1.1. Project background**

Zhongan Investments (Pty) Ltd, a Namibian registered company is the applicant of Exclusive Prospecting License (EPL 8741) located in Karibib constituency, Erongo Region. The exploration programme is aimed at unveiling the mineral economic potential of the area under question. The issuance of an Environmental Clearance Certificate by Ministry of Environment, Forestry and Tourism (MEFT) will pave way for the envisaged exploration activities. The Ministry of Mines and Energy (MME), through the department of Mines undertakes to exploit the country's mineral resources through issuance of mineral rights and it is through this process that EPL 8741 was provisionary issued to Zhongan Investments Pty Ltd on 30 March 2022. Should the resource prove to economically feasible, the subsequent exploitation would provide social and economic development within the region and the country at large.

### **1.1.1 Project Description**

The exclusive prospecting license area (EPL 8741) is 1892.2808 Hectares. The exploration process will involve geophysical surveys, stream sediment sampling, soil sampling, laboratory analysis, trenching, RC and diamond drilling. The focus of the exploration to search for mineralization of economic value and the exploration strategy to be employed will revolve around the mineralization model.

## **1.2 Project location**

The project area is located in western central Namibia in Erongo Region ([Fig. 1](#)), 90 km by road south-southwest of the town of Karibib ([Fig. 2](#)) and covers the farms Vlakteplaas 110, Vlakteplaas 110 Portion No. 1 and Bloemhof 109 ([Fig. 3](#)).

The GPS coordinates for the project area are given in Table 1 covering a total of 1892.2808 Hectares.

Table 1. GPS coordinates demarcating the boundary of EPL 8741.

	Latitude	Longitude
1	22° 27' 51.66" S	015° 19' 27.21" E
2	22° 27' 38.32" S	015° 22' 13.66" E
3	22° 29' 58.82" S	015° 21' 02.96" E
4	22° 29' 57.83" S	015° 18' 19.98" E

The GPS coordinates from the center of the EPL is 22°29'8.86"S 15°20'9.00"E (-22.485795° 15.335832°).

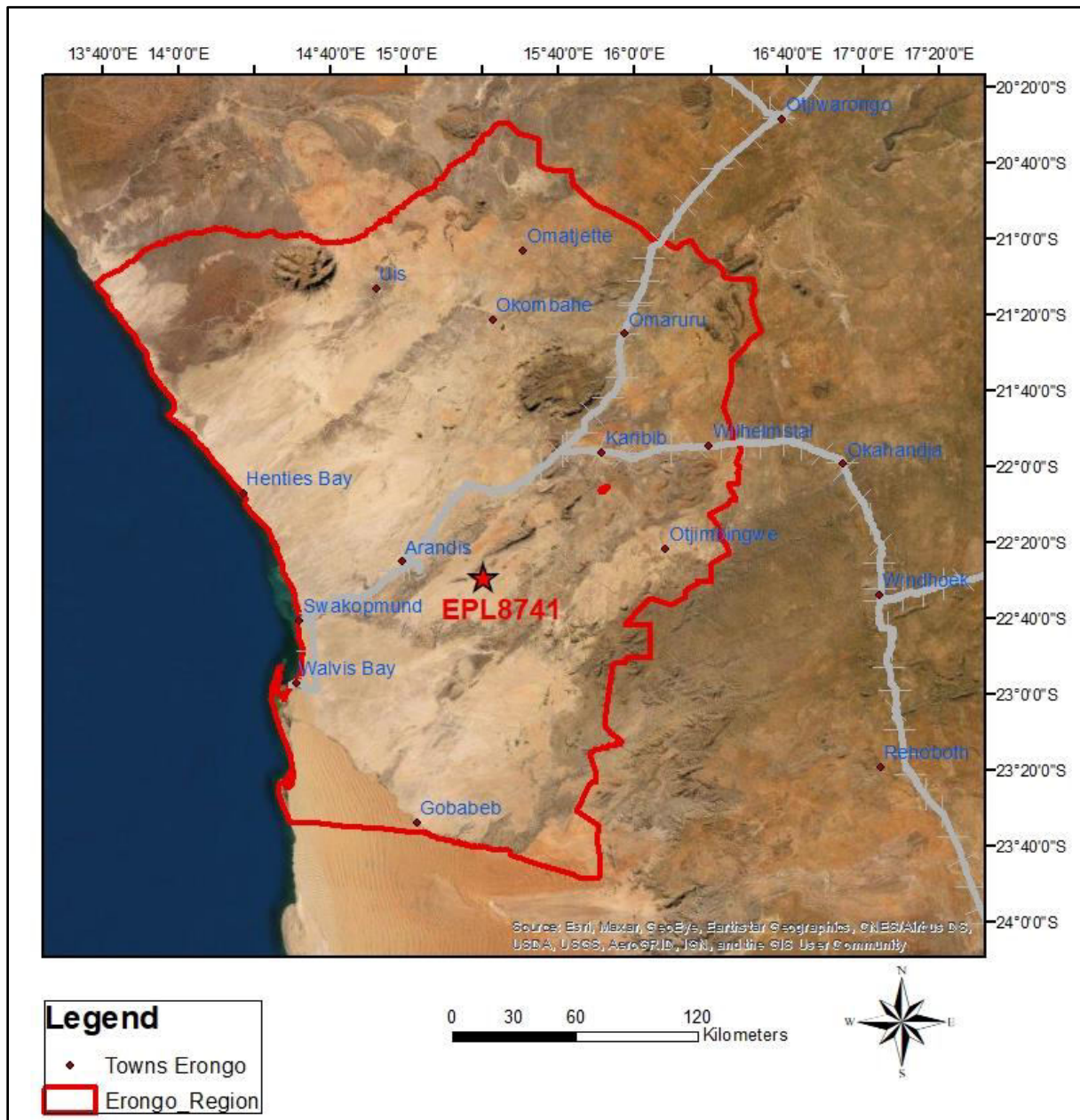
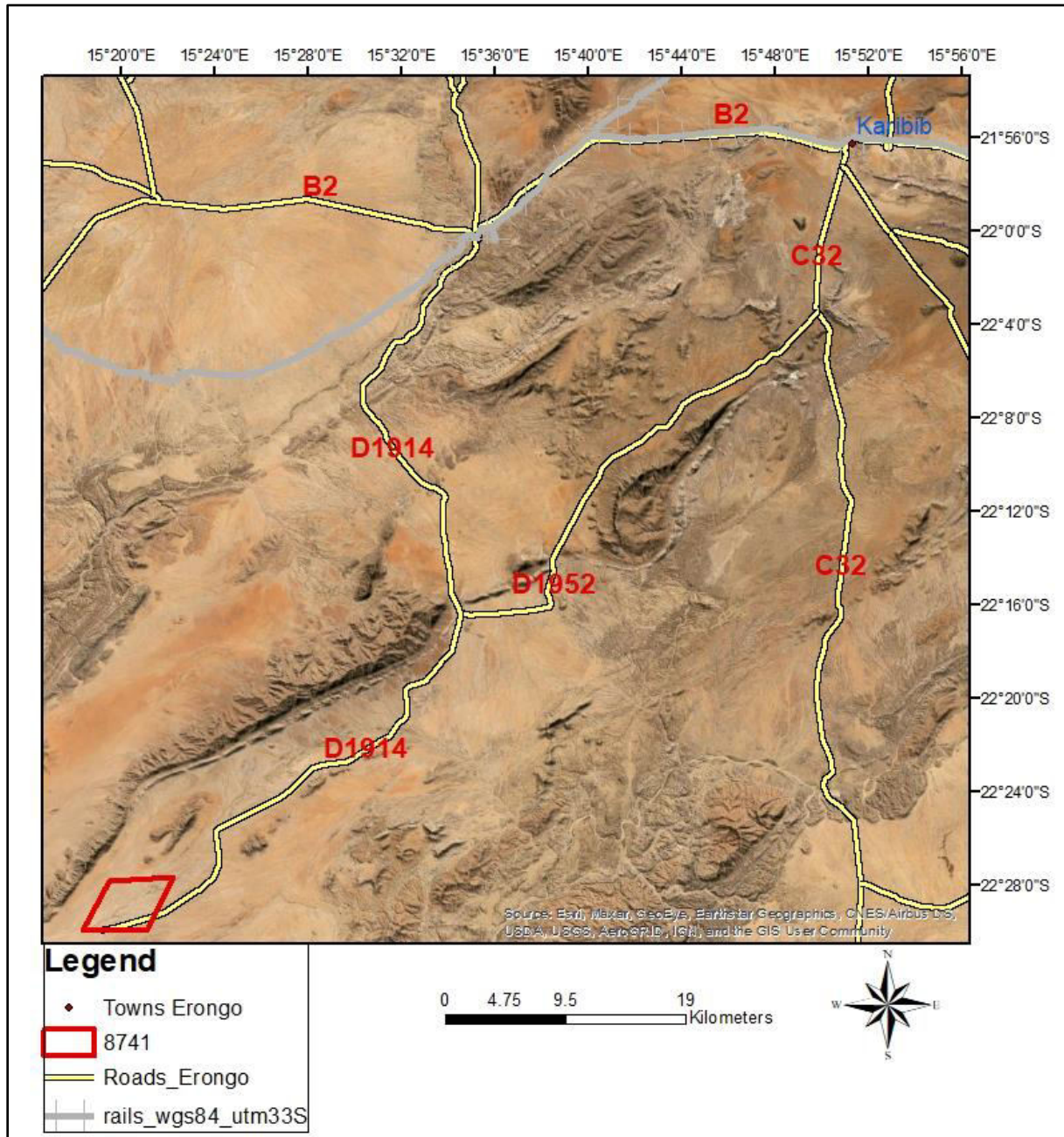


Fig. 1. Locality of EPL 8741 in Erongo Region, western central Namibia.



**Fig. 2.** Google map showing the location EPL 8741, approximately 90 km by road south-southwest of the town of Karibib, in Karibib district. The EPL is accessible via C32, D1952 and D1914 gravel roads. The EPL boundary is demarcated by the red polygon.

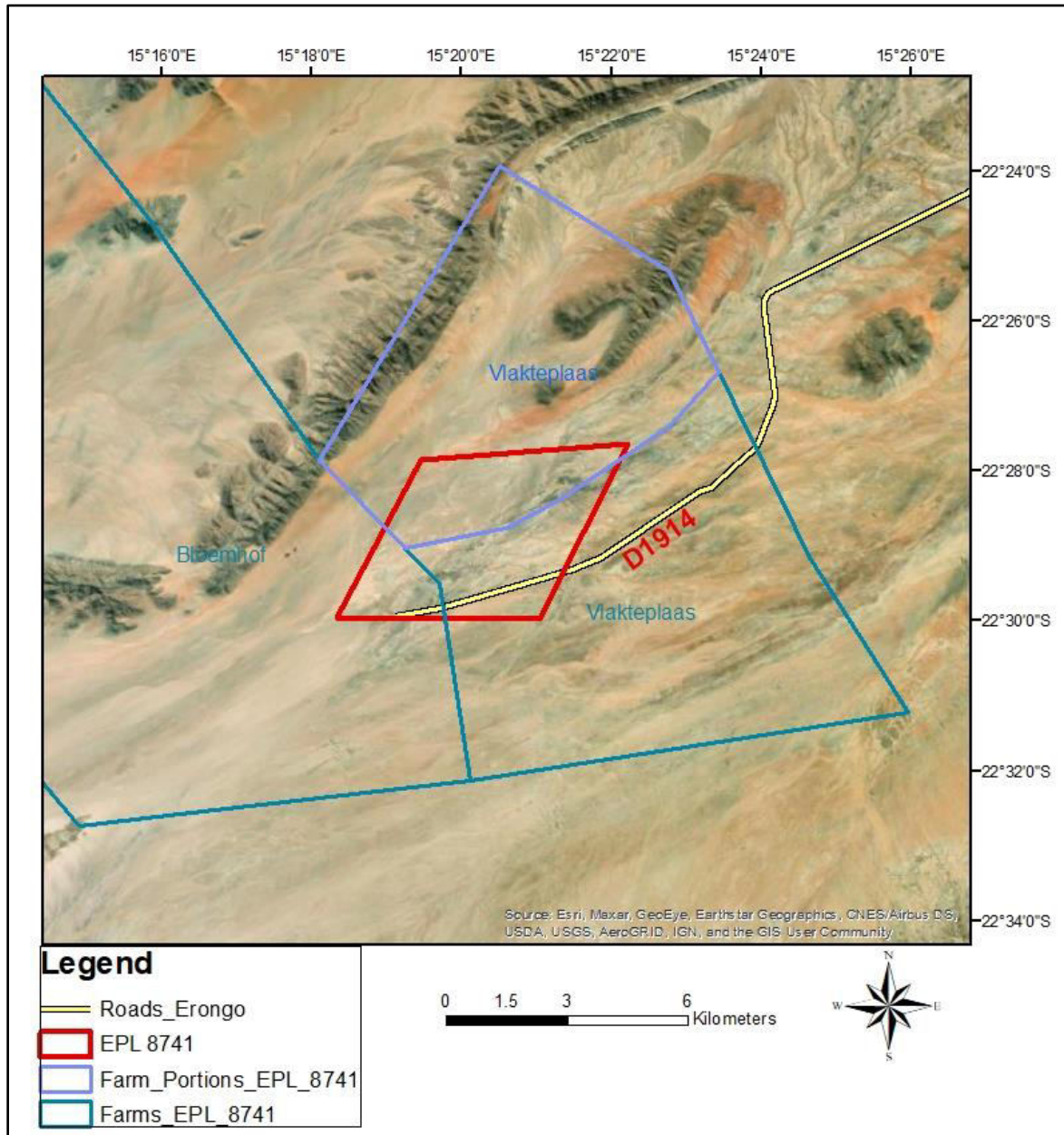


Fig. 3. Farms covered by EPL 8741, The EPL is accessed via D1914 gravel road.

### **1.3. Project Motivation**

The Ministry of Mines and Energy (MME), through the department of Mines undertakes to exploit the country's mineral resources through issuance of mineral rights and it is through this process that EPL 8741 was conditionally issued to Zhongan Investments (Pty) Ltd. Should the resource prove to be economically feasible, the subsequent exploitation would provide social and economic development within the region and the country at large.

### **1.4. Exploration programme activities**

Activities will include:

- Geological mapping - Involves visual assessment of outcropping rocks: No environmental impact, no activity footprint to be left behind.
- Ground geophysical surveys – Handheld geophysical equipment or drones are utilized to collect data from subsurface rocks. This is achieved through traversing lithological units of interest: this process does not leave behind any environmental impact and activity footprint.
- Geochemical sampling – A small holes of roughly a few centimeters deep are dug from which sample/s are collected and the hole is then covered after sampling leaving no activity footprint left behind.
- Trenching – A trench is a ground excavation that generally deeper than its width and narrower than its length. Trenching is mainly for purposes of the orientation of the targeted lithology and mineralization as well as sampling. Impact is localized and the trenches are covered after sampling leaving to no activity footprint.
- Pitting - excavation or diggings of areas are done to obtain a representative bulk sample of the mineralization as well as getting a 3D view of the mineralization. Impact is also localized and the trenches are covered after sampling leaving to no activity foot print.
- RC and diamond drilling - Holes are drilled and drill samples collected will be used for geotechnical analysis and analysis of elements and minerals. Holes are capped after drilling and the drilling site for each hole is localized and rehabilitated after drilling.



## **1.5. Identification of environmental aspects**

The exploration activities listed above have potential impact on the environment. Environmental aspects and potential impacts were identified during the screening and assessment phases of the EIA, in consultation with authorities, Interested and Affected Parties and the environmental team. As requested from the Ministry of Environment, Forestry and Tourism, an assessment Report with assessment and Environmental Management Plan have been prepared for the exploration activities. The following issues were assessed in this process and the findings are presented in this Assessment Report:

- Air quality – dust emissions related to vehicles and drilling activities
- Biodiversity
- Socio-economic
- Land-use
- Noise
- Surface water/Groundwater
- Ground water
- Waste management

## **1.6. Assessment findings**

**Air quality:** This assessment was conducted in terms of dust generated from drilling and vehicle entrainment on gravel and off roads, in close proximity to residents. In the unmitigated scenario there is the potential for nuisance impacts relating to people residing in the surrounding area. However, with appropriate mitigation and management the potential impacts are greatly reduced and the significance rating falls to low.

**Biodiversity:** The assessment for biodiversity relates to the impact that personnel performing exploration activities have on the surrounding fauna and vegetation. It specifically focuses on the impacts associated with illegal hunting, poaching and the collection of firewood. In the unmitigated scenario the severity and the probability of the impacts were found to be medium, however, with mitigation and management measures both were reduced to a rating of low.

**Socio-Economic:** The assessment of socio-economic impacts focuses on the inconvenience the exploration activities have on the landowners. Specifically, the need for access, leaving farm gates open/unlocked and the increased risk of criminal activities. In the unmitigated scenario the significance rating is medium, however, with appropriate mitigation and management the potential impacts are greatly reduced and the significance rating falls to low.

**Land-use:** The assessment for land use refers specifically to the impact the exploration activities have on professional hunting activities. In the unmitigated scenario the duration of the impact was found to be medium, as there may be period where the land cannot be used for hunting purposes. With the addition of mitigation and management measure, the duration drops to low and the significance rating drops from medium to low.

**Noise:** The assessment of noise impacts is with specific regard to exploration activities taking place near a residence and resulting in a nuisance impact, and the severity of the impact is rated medium. In the mitigated scenario, the severity of the impact is reduced and is rated low.  
Surface water/

**Groundwater:** The assessment relates to the impacts associated with the spillage of hydrocarbons within the exploration area, with specific regard to water resources. Given the relatively localized nature of the activities, as well as the introduction of hydrocarbon spill management measures, the significance rating for both the unmitigated and mitigated scenario remain low.

**Waste management:** Given the remote location and the land-use, the dumping of domestic waste within the exploration area could prove hazardous to wildlife and livestock, as well as impede agricultural production. However, given the small scale of the activities, a large amount of waste will not be generated. With mitigation and management measures in place the rating remains low. The details regarding the management and mitigation measures can be found in Section 8 and the Environmental Management Plan.

### **1.7. Purpose of the Assessment Report**

The assessment report is prepared for the Environmental Impact Assessment for Mineral exploration activities on an area which is located approximately 90 km by road south-southwest of the town of Karibib by road on farms Vlakteplaas 110, Vlakteplaas 110 Portion No. 1 and Bloemhof 109 (Fig. 3). The main purpose of this report is to provide information relating to the proposed exploration activities and to indicate which environmental aspects and potential impacts that have been identified during the screening and assessment phases. Environmental assessment is a critical step in the preparation of an EIA for the proposed exploration activities. The assessment process identifies the issues that are likely to be most important during the EIA and eliminates those that are of little concern. The assessment process shall be concluded with the establishment of terms of reference for the preparation of an EIA, as set out by the Ministry of Environment, Forestry and tourism. The purpose of this assessment report is to:

- ❖ Identify any important environmental issues to be considered before the commencement of the proposed exploration activities in EPL 8741.
- ❖ To identify appropriate time and space boundaries of the EIA study.
- ❖ To identify information required for decision-making.

As such, the key objectives of this assessment study are to:

- ❖ Inform the public about the proposed exploration activities.
- ❖ Identify the main stakeholders and incorporate their comments and concerns.
- ❖ Define reasonable and practical alternatives to the proposal.
- ❖ To establish the terms of reference for an EIA study.

The assessment study provides a clear description of the environment that may be affected by the activity and the manner in which the activity may affect the environment. Information relating to the receiving environment and its social surroundings has been sourced through the following methods;

- ❖ Site visits to collect primary data;
- ❖ Legal and policy review;
- ❖ Gathering existing information relating to similar developments and issues;
- ❖ Discussions, meetings and site visits with authorities;
- ❖ Opinions and concerns raised by I&AP's and stakeholders; and
- ❖ Qualified opinions from professional studies.

### **1.8. Terms of Reference**

This assessment study was carried out in accordance with the Environmental Management Act (No. 7 of 2007) and Environmental Regulations of 2012, as well as the Terms of Reference (ToR) which were provided by the proponent). It is a guiding document which indicates the description of the environment that may be affected by the activity and the manner in which the activity may affect the environment. Information relating to the receiving environment and its social surroundings has been sourced through the following methods:

- Legal and policy review; Identify all legislation and guidelines that have reference to the proposed project.
- Identify existing environmental (both bio-physical and socio-economic) conditions of the area.
- Inform Interested and Affected Parties (I&APs) and relevant authorities of the details of the proposed development and provide them with a reasonable opportunity to participate during the process.
- Consider the potential (both bio-physical and socio-economic) impacts of the development and assess the significance of the identified impacts.

- Document opinions and concerns raised by I&AP's and stakeholders.
- Describe the need and desirability of the activity, propose alternative measures where it is noticed that adverse effects may occur.
- Provide a high level of environmental and social impact assessment on feasible alternatives that were considered.
- Outline management and mitigation measures in an Environmental Management Plan (EMP) to minimize and/or mitigate potentially negative impacts.
- Submit the final assessment report to the competent authority and the Environmental Commissioner.

### **1.8.1 Objectives of the Environmental Assessment Process**

The main objective of this environmental assessment is to determine and assess the potential environmental impacts that are likely to result from the proposed exploration activities under EPL 8741. In a nutshell, an environmental assessment process is carried to achieve better developmental interventions through protecting human, physical, and biotic environments. This is one component in the environmental planning and management of projects, that focuses upon the consent stage of the project. The study entails assessments of likely short and long term positive and negative environmental impacts of the activities related to the proposed exploration project.

This Scoping Report (including an assessment of impacts), together with the EMP, will provide sufficient information for the Ministry of Mines and Energy (MME) as the Competent Authority and the Ministry of Environment, Forestry and Tourism (MEFT) to make an informed decision regarding the proposed project, and whether an environmental clearance certificate can be issued or not.

The assessment covered the proposed study for the following developmental stages:

- Pre-construction and Construction

- Operation and ongoing monitoring
- Decommissioning and closure

### **1.8.2 Environmental legal requirements**

The proposed exploration activities form part of the listed activities that may not be undertaken without conducting an EIA in terms of Section 27 of the Environmental Management Act (EMA) and the Environmental Regulations procedure (GN 30 of 2012). As such, an environmental clearance certificate must be applied for in accordance with regulation 6 of the 2012 environmental regulations. The proposed development is a listed activity that may not be undertaken without an Environmental Clearance Certificate (ECC). Listed activities triggered by the project in terms of the Environmental Management Act, No. 7 of 2007 and its regulations are as follows:

- 3.1 The construction of facilities for any process or activities which requires a licence, right or other form of authorization, and the renewal of a licence, right or other form of authorization, in terms of the Minerals (Prospecting and Mining Act),1992.
  - The proposed project has conditionally obtained an EPL from MME; the proponent now requires an environmental clearance certificate from DEA/MEFT for mineral exploration/prospecting.
- 3.2 Other forms of mining or extraction of any natural resources whether regulated by law or not.
- 3.3 Resource extraction, manipulation, conservation, and related activities.
- Soil and rocks will be sampled within selected target areas of the project area.
  - Soil and rocks will be sampled within selected target areas of the project area.
- 8.1 The abstraction of ground or surface water for industrial or commercial purposes.

### **1.8.3 Purpose of the Assessment Report**

The assessment report is prepared for the Environmental Impact Assessment for Mineral exploration activities on EPL 8741. The main purpose of this report is to provide information relating to the proposed exploration activities and to indicate which environmental aspects and potential impacts that have been identified during the screening and assessment phases. Environmental assessment is a critical step in the preparation of an EIA for the proposed exploration activities. The assessment process shall be concluded with the establishment of terms of reference for the preparation of an EIA, as set out by the Ministry of Environment, Forestry and tourism. The purpose of this assessment report is to:

- ❖ Identify any important environmental issues to be considered before the commencement of the proposed exploration activities in EPL 8741.
- ❖ To identify appropriate time and space boundaries of the EIA study.
- ❖ To identify information required for decision-making.

As such, the key objectives of this assessment study are to:

- ❖ Inform the public about the proposed exploration activities.
- ❖ Identify the main stakeholders and incorporate their comments and concerns.
- ❖ Define reasonable and practical alternatives to the proposal.
- ❖ To establish the terms of reference for an EIA study.

The assessment study provides a clear description of the environment that may be affected by the activity and the manner in which the activity may affect the environment. Information relating to the receiving environment and its social surroundings has been sourced through the following methods;

- ❖ Site visits to collect primary data;
- ❖ Legal and policy review;
- ❖ Gathering existing information relating to similar developments and issues;
- ❖ Discussions, meetings and site visits with authorities;
- ❖ Opinions and concerns raised by I&AP's and stakeholders; and
- ❖ Qualified opinions from professional studies.

This report is the Assessment Report. Taking the above mentioned into consideration, this report, together with the attached EMP, will provide sufficient information for MEFT to make an informed decision regarding the proposed exploration activities, and whether an environmental clearance certificate can be issued or not. A schematic representation of the EIA process in Namibia is given in [Fig. 4](#).



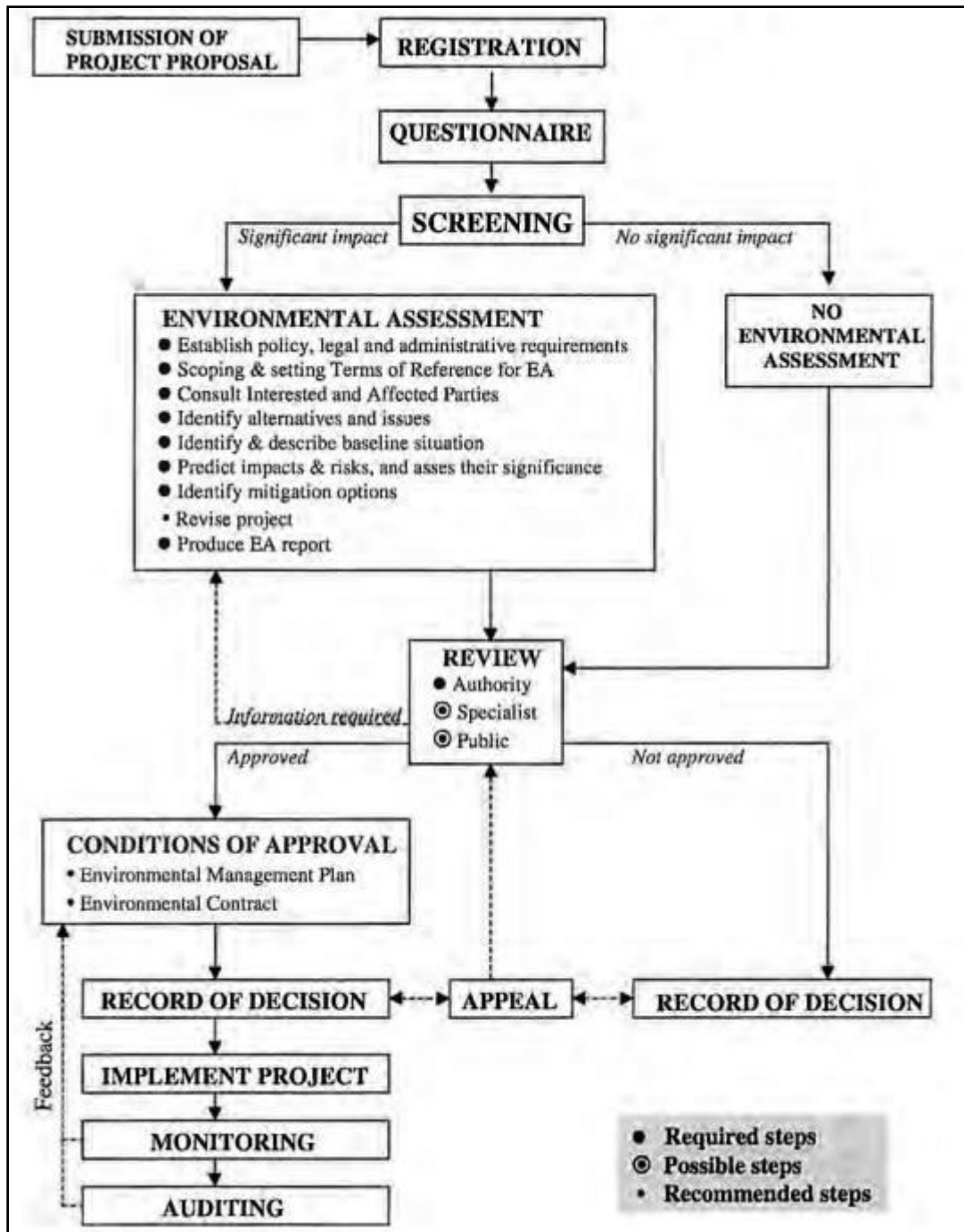


Fig. 4. General schematic presentation of the Environmental Impact Assessment process in Namibia (SELH, 2012).

#### 1.8.4 Environmental Consultant

Minera-Xplore Consultancy (Reg. No. CC/2021/10286) is a wholly Namibian owned close corporation, established in 2021 to provide consulting services to various public and private sectors in areas such as Strategic Environmental Assessments (SEA), Environmental Impact Assessments (EIA) and development of Environmental Management Systems. The Environmental Assessment Practitioner (EAP) for this study is Ms. N Ndakunda. Her main area of expertise includes Mineral exploration, Environmental Management as well as Groundwater exploration and resource management. She holds a B.Sc (Honours) in Geology (University of Namibia), B.Sc (Honours) in Geohydrology (University of Free State) and is currently doing a Master's Degree in Integrated Environmental Management & Sustainable Development (International University of Management). CV is attached for further information on her educational qualifications and experience.

### **1.9. Synopsis of the EIA process**

Environmental Impact Assessment (EIA) Regulations, 2012 and the Environmental Management Act (EMA), 2007, (Act No. 7 of 2007) served as the guiding tools for the EIA and EMP process. The environmental assessment steps undertaken and way forward are summarized as follows:

- Preparation of the Background Information Document (BID) (*Carried out in June 2022*).
- Preparation of the Public Notice published in the local newspapers as part of required public consultation process (*Carried out in May/June 2022*).
- Public notices were published in the Confidante Newspaper (*03 – 16 June 2022*) and Windhoek Observer (*31 May to 14 June 2022*).
- Online registration of the project with MEFT through an online Portal ([www.eia.met.gov.na](http://www.eia.met.gov.na)) (*carried out in June 2022*).
- Stakeholder register made available to I&APs to register their comments and inputs via email for inclusion in the EIA and EMP Reports (*31 May 2022 to 30 June 2022*)
- Public meeting was held on *18 June 2022* in Karibib.

- EIA and EMP reports (hard copies) to be submitted to the Environmental Commissioner in MEFT through the MME (Competent Authority) and submission of digital copies with MEFT (to be *carried out in July 2022*).
- Additional 14 days to be afforded to the interested and affected parties to submit comments / inputs on the proposed project activities directly to the Environmental Commissioner after submission of the application for ECC to the Environmental Commissioner, on the MEFT digital Portal: [www.eia.met.gov.na](http://www.eia.met.gov.na). (to be *carried out in July 2022*).
- Wait for the Decisions from the Environmental Commissioner (*from July 2022*).

### **1.9.1 Environmental assessment approach and methodology**

Environmental assessment process in Namibia is governed by the Environmental Impact Assessment (EIA) Regulations No. 30 of 2012 gazetted under the Environmental Management Act, (EMA), 2007, (Act No. 7 of 2007) and in line with the provisions of the Cabinet approved Environmental Assessment Policy for Sustainable Development and Environmental Conservation of 1995. This report has taken into consideration all the requirements for preparation of all the supporting documents and application for an Environmental Clearance Certificate and lodgments of such application to the Environmental Commissioner (EC), Department of Environmental Affairs (DEA) in the Ministry of Environment, Forestry and Tourism (MEFT). The purpose of the Assessment Phase was to communicate the scope of the proposed project to Interested and Affected Parties (I&APs), to consider project alternatives, to identify the environmental (and social) aspects and potential impacts for further investigation and assessment, and to develop the terms of reference for specialist studies to be conducted in the Impact Assessment Phase if necessary. The steps undertaken during the Assessment Phase are summarized in the subsections below.

### **1.9.1.1 Project initiation and screening**

The project was registered on the online ECC portal (eia.met.gov.na) in order to provide notification of the commencement of the EIA process and to obtain clarity on the process to be followed.

### **1.9.1.2 Initial assessment public participation process**

The objective of the public assessment process was to ensure that interested and affected parties (I&APs) were notified about the proposed project, given a reasonable opportunity to register on the project database and to provide initial comments. Steps that were undertaken during this phase are summarized below:

#### **I&AP identification:**

A project specific I&AP stakeholder database was developed. This database has been maintained and updated as and when required. A copy of the I&AP database is attached in Appendix A. The farmer's contact details were obtained during site visit, contact details of other interested and affected parties that were provided by the proponent. Furthermore, I&APs were added to the database based on responses to the advertisements and notification letters.

#### **Notification letter and Background Information Document (BID):**

BIDs were distributed via email to relevant authorities and stakeholder on the I&APs database. A notification letter was also distributed for review and comment for a period of over 4 weeks after commencement of the project. The purpose of the BID was to inform I&APs about the proposed project, the assessment process being followed. Attached to the BID was a registration and response form, which provided I&APs with an opportunity to submit their names, contact details and comments on the project. A copy of the BID is attached in Appendix.

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### **Advertisements and site notice:**

Advertisements announcing the proposed project, the availability of the BID, a public meeting and the I&AP registration / comment period were placed in two newspapers namely: Confidènte newspaper and Windhoek Observer newspaper, for two consecutive weeks from 31<sup>st</sup> of May to the 16<sup>th</sup> of June 2022. A public meeting was held on 18 June at Usab Community Hall in Karibib. Site notices were placed on the boundaries of farm fences, on the notice boards of the Regional Council and around Karibib town for public viewing. The only comments obtained was during the public meeting and are incorporated in the assessment report. The concerns raised during the meeting were addressed and responded to as indicated in the public participation section of the assessment report.

#### **1.9.1.3 Compilation and Review of Draft Assessment Report (DSR)**

The Draft assessment report (DSR) was prepared in compliance with Section 8 of the EIA Regulations of 2012 and incorporated with comments received during the initial Public Participation Process. The DSR will be distributed for a 14-day review and comment period.

#### **1.9.1.4 Final Assessment Report and Completion of the Assessment Phase**

The Final Assessment Report (FSR) summarises the following: the legal and policy framework; approach to the EIA and process methodology; the project's need and desirability; proposed project activities; key characteristics of the receiving environment; and key issues of concern that will be further investigated and assessed in the next phase of the EIA. The FSR complies with Section 8 of the EIA Regulations 2012. All written submissions received during the DSR review and comment period will be collated and responded to. The FSR will be submitted to the competent authority. In terms of Section 32 of the Environmental Management Act, 2007 (No. 7 of 2007),

the competent authority is then required to make a recommendation on the acceptance or rejection of the report to Ministry of Environment, Forestry and Tourism (MEFT): Department of Environmental Affairs (DEA), who will make the final decision.

#### **1.10. List of Specialist Studies Undertaken**

Section 9(a) of the Environmental Regulations of 2012 requires a disclosure of all the tasks to be undertaken as part of the assessment process, including any specialist to be included if necessary. A specialist study on archaeology was undertaken by a qualified archaeologist. As part of the study, a foot survey was undertaken to identify any potential artefacts or human remains which may occur in the area. The archaeological specialist study, together with the consent letter from the Heritage Council of Namibia, is annexed to this report.

#### **1.11. Need of the Exploration Project**

Exploration forms part of the backbone of the mining industry as is the only process through which the mineral potential of a given area can be realized and it's through exploration activities that the much sought-after ore deposits of economic potential can be discovered. When favourable results are obtained from the exploration process, resulting in delineation of an orebody of economic potential, mineral extraction, the sought-after target for mining industry, which is important to the nation and the country in terms of employment, wealth creation and economic development. The mining industry contributes 10% to GDP and provides over 16,000 direct employment.

A mining project which is the end result of the proposed exploration project may assist in helping Namibia attain some of the goals set out in National Development Plans such as the Fifth National Development Plan (NDP5) and the Harambee Prosperity Plan (HPP).

This exploration project has potential for establishment and operation of the mineral exploration program which will create both direct and indirect jobs. Employment on the new project will be attractive to the local workforce by virtue of the comparatively high wages offered; this will boost

economic growth in the economy of Karibib Constituency and surrounding areas as well as the country at large.

### **1.12. Alternatives**

Desired minerals are by nature difficult to locate as it requires extensive prospecting for that particular quality as per market demand. On the other hand, mineral demand depends on color, scarcity, durability and market demand. The proposed exploration site has potential to host significant quantities of mineral. The proposed project is in an area dominated by mineral exploration activities and previous extensive prospecting has indicated the presence of minerals on these properties. Since, minerals can only be mined where identified and their quality verified, it was not practical to select any other sites. Therefore no location alternative was considered.

### **1.13. No-Go Alternatives**

A comparative assessment of the environmental impacts of the ‘no-go’ alternative (a future in which the proposed EPL exploration activities do not take place) has been undertaken. An assessment of the environmental impacts of a future, in which the proposed EPL exploration does not take place, may be good for the receiving environment because there would be no negative environmental impacts due to the proposed exploration activities in the given area of the EPL.

The environmental benefits will include no negative environmental impact on the receiving environment. However, it is important to understand that even if the proposed exploration activities do not take place, to which the likely negative environmental impacts is likely to be low and localized, the current and other future land uses such as agriculture will still have some negative impacts on the receiving environment. There are likely negative environmental impacts of other current and future land uses that may still happen in the absence of the proposed exploration activities.

Furthermore, it's also important to understand what benefits might be lost if the proposed exploration activities do not take place. Key losses that may never be realized if the proposed project activities do not go-ahead include: Loss of potential added value to the unknown mineral and metal resources that maybe found within the EPL area, socioeconomic benefits derived from current and future mining and exploration activities, direct and indirect contracts and employment opportunities, export earnings, foreign direct investments, license rental fees, royalties and various other taxes payable to the Government.

In conclusion, no-go alternative will mean that the current land activities such as farming and important vegetation species will not be disturbed, that is, there will not be disturbance of the flora and fauna. No-go alternative will result in the non-mining of minerals and bring benefitions to the receiving environment. However, the no-go alternative is not considered since it will lead to negative socio-economic impacts.

#### **1.14. Potential Land Use Conflicts**

Considering the current land use practices (agriculture, mining and/or exploration) it's likely that the exploration project in the general area can still co-exist with the existing and potential future land use options of the general area. However, much more detail assessment of any likely visual and other socioeconomic impacts will need to be undertaken as part of the EIA. The use of thematic mapping thereby delineating zones for specific uses such as conservation, mining or tourism etc, within the EPL area will greatly improve the multiple land use practices and promote coexistence.

## **2. Summary of applicable legislation**

All mineral rights in Namibia are regulated by the Ministry of Mines and Energy (MME) whereas environmental regulations are regulated by the Ministry of Environment, Forestry and Tourism (MEFT). The legislation/acts that affect the implementation, operation and management of exploration activities in Namibia are shown below.



## **2.1. Constitution of the Republic of Namibia, 1990**

The Constitution is the supreme law in Namibia, providing for the establishment of the main organs of state as well as guaranteeing various fundamental rights and freedoms. Provisions relating to the environment are contained in Chapter 11, article 95, which is entitled “promotion of the Welfare of the People”. This article states that the Republic of Namibia shall – “actively promote and maintain the welfare of the people by adopting, inter alia, policies aimed at maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of living natural resources on a sustainable basis for all Namibians, both present and future.

## **2.2. Environmental Management Act of 2007**

**Line Ministry:** Ministry of Environment, Forestry and Tourism

The regulations that accompany this act lists several activities that may not be undertaken without an environmental clearance certificate issued in terms of the Act. The act further states that any clearance certificate issued before the commencement of the act (6 February 2012) remains in force for one year. If a person wishes to continue with activities covered by the act, he or she must apply for a new certificate in terms of the Environmental Management Act.

## **2.3. The Minerals Prospecting and Mining Act of 1992**

**Line Ministry:** Ministry of Mines and Energy

The Minerals Prospecting and Mining Act No.33 of 1992 approves and regulates mineral rights in relation to exploration, reconnaissance, prospecting, small scale mining, mineral exploration, large-scale mining and transfers of mineral licences.

## **2.4. Water Resources Management Act of 2013**

**Line Ministry:** Ministry of Agriculture, Water and Land Reform

The act provides for the management, protection, development, usage and conservation of water resources; to provide for the regulation and monitoring of water resources and to provide for incidental matters.

## **2.5. Nature conservation ordinance, ordinance No. 4 of 1975**

**Line Ministry:** Ministry of Environment, Forestry and Tourism

The Nature Ordinance 4 of 1975 covers game parks and nature reserves, the hunting and protection of wild animals (including reptiles and wild birds), problem animals, fish, and the protection of indigenous plants. It also establishes a nature conservation inland fisheries, keeping game and other wild animals in capturing. In addition, the ordinance also regulates game dealers, game skins, protected plants, birds kept in cages, trophy hunting of hunt-able game, hunting at night, export of game and game meat, sea birds, private game parks, nature reserves, regulations of wildlife associations and registers for coyote getters.

## **2.6. National Heritage Act, 2004 (Act No. 27 of 2004)**

**Line Ministry/Body:** National Heritage Council

The National Heritage 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 Council; to establish a National Heritage Register; and to provide for incidental matters.

## **2.7. Petroleum Products and Energy Act No. 13 of 1990**

**Line Ministry/Body:** Ministry of Mines and Energy

The act regulates the importation and usage of petroleum products. The act reads as

“To provide measures for the saving of petroleum products and an economy in the cost of the distribution thereof, and for the maintenance of a price thereof; for control of the furnishing of certain information regarding petroleum products; and for the rendering of services of a particular kind, or services of a particular standard; in connection with motor vehicles; for the establishment of the National Energy Fund and for the utilization thereof; for the establishment of the National Energy Council and the functions thereof; for the imposition of levies on fuel; and to provide for matters incidental thereof”.

## **2.8. Forest Act, No. 12 of 2001**

**Line Ministry/Body:** Ministry of Agriculture, Water and Land Reform

The act regulates the cutting down of trees and reads as follows “To provide for the establishment of a Forestry Council and the appointment of certain officials; to consolidate the laws relating to the management and use of forests and forest produce; to provide for the protection of the environment and control and management of forest trees; to repeal the preservation of Bees and Honey proclamation 1923, preservation of Trees and Forests Ordinance, 1952 and the Forest Act, 1968; and to deal with incidental matters”.

The constitution defines the function of the Ombudsman and commits the government to sustainable utilization of Namibia’s natural resources for the benefit of all Namibians and describes the duty to investigate complaints concerning the over-utilization of living natural resources for the benefit of all Namibians and describes the duties to investigate complaints concerning the over-utilization of living natural resources, the irrational exploitation of non-renewable resources, the degradation and the destruction of ecosystem and failure to protect the beauty and character of Namibia. Article 95 states that “*the state shall actively promote and maintain the welfare of the people by adopting; inter-alia policies aimed at maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of natural resources on a sustainable basis for the benefit of all Namibians both present and future*”.

## **2.9. Atmospheric Pollution Prevention Ordinance 11 of 1976**

**Line Ministry/Body:** Ministry of Health and Social Services

This ordinance provides for the prevention of air pollution and is affected by the Health Act 21 of 1988. Under this ordinance, the entire area of Namibia, with the exception of East Caprivi, is proclaimed as a controlled area for the purposes of section 4(1) (a) of the ordinance.

## **2.10. Hazardous Substance Ordinance, No. 14 of 1974**

**Line Ministry/Body:** Ministry of Safety and Security

The ordinance provides for the control of toxic substances. It covers manufacture, sale, use, disposal and dumping as well as import and export. Although the environmental aspects are not explicitly stated, the ordinance provides for the importing, storage and handling.

## **2.11. Namibian Water Corporation (Act 12 of 1997)**

**Line Ministry/Body:** Namibian Water Corporation

The act caters for water rehabilitation of prospecting and mining areas, environmental impact assessments and for minimizing or preventing pollution.

## **2.12. Public and Environmental Health Act, 2015**

**Line Ministry/Body:** Ministry of Health and Social Services provide a framework for a structured uniform public and environmental health system in Namibia; and to provide for incidental matters.

## **2.13. Agricultural (Commercial) Land Reform Act 6 of 1995**

**Line Ministry/Body:** Ministry of Lands and Resettlement

To provide for the acquisition of agricultural land by the State for the purposes of land reform and for the allocation of such land to Namibian citizens who do not own or otherwise have the use of any or of adequate agricultural land, and foremost to those Namibian citizens who have been socially, economically or educationally disadvantaged by past discriminatory laws or practices; to vest in the State a preferment right to purchase agricultural land for the purposes of the Act; to provide for the compulsory acquisition of certain agricultural land by the State for the purposes of the Act; to regulate the acquisition of agricultural land by foreign nationals; to establish a Lands Tribunal and determine its jurisdiction; and to provide for matters connected therewith.

## **3. Infrastructure and Services**

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### **3.1 Power supply**

The various machinery and equipment required for drilling or excavations will have their own power supplies and or generators attached. Fuel will be stored in small mobile tanks/ containers. The drill rigs are re-fueled with Jerry cans. The power requirements for the proposed exploration activity will be minimal as power will only be required for powering small machinery during the exploration process.

### **3.2 Water Supply**

Water will be required for diamond core drilling and for dust suppression. Water can be supplied through existing farm boreholes or newly drilled boreholes specifically for exploration activities or trucked in from the closest water source. While it would be more efficient to utilize existing

boreholes on the property, this would depend on the agreement reached with each landowner. An alternative is to source water from the town of Karibib and transport it to site. Water containers will be brought on site and utilized whenever necessary. The water will mostly be used for general consumption and drilling.



Fig. 5. Similar containers to be used for portable water

### 3.3 Roads

The proposed exploration activity area is located approximately 90 km by road south-southwest of the town of Karibib and is accessible via C32, D1952 and D1914 gravel roads (Fig. 2). The two gravel roads are well-maintained. Location of off-road tracks to be constructed in consultation with surface landowners.

### 3.4 Accommodation, transportation and infrastructure.

All the staff members will be based in the town of Karibib during the exploration programme. Staff transport arrangements from Karibib to exploration sites will be provided by the proponent. Another available option would be to camp on site with consent from the landowner or

alternatively make use of available accommodation facilities on one of the farms if agreeable to the property owner.

Portable fire-extinguishers will be fitted on all vehicles as well as in the mobile containers where possible. Provision will be made for two-way radios to enable the drill rig operators and the onsite staff to communicate effectively. An alternative is for all personnel to be housed in suitable accommodation either on or off-site. Guest accommodation is available in and around the EPL areas. Some landowners might be willing to accommodate exploration teams in established housing on the farm. Camp facilities for the storage of equipment and material will be erected, along with ablution facilities for workers.

### **3.5 Employment**

Qualified and registered Namibian drilling contractors will be utilized to conduct the drilling program. Overall supervision of drilling activities will be by Zhongan Investment's appointed staff. A drilling team will consist of a drill operator and usually three to four support staff, including drivers. Supervision of drilling activities will be done by Zhongan staff consisting of one or two geologists, geo-technicians and 2 technical assistants and 7 labourers. The employees will be sourced from the local community. All employees will undergo a safety induction, first aid training course and wildlife awareness program. The Labour Act of 2007 will always be adhered to.

### **3.6 Waste dumps and management**

The following types of waste will be generated in small volumes during the exploration:

- Domestic waste (non-hazardous): Domestic waste will be stored in a manner that there can be no contamination to the environment and shall be disposed of correctly. Potential hydrocarbon spills from vehicles and drilling equipment might lead to soil contamination and needs to be treated as a hazardous waste if not bio-remediated.



**Fig. 6.** Garbage bins similar to these to be made available on site.

In choosing a waste dumpsite, the following aspects will be strongly considered:

- Topography
- Land-use in the area
- The presence of any hazardous geological structures
- Groundwater considerations
- The prevailing wind direction in the area
- Visual impacts that the waste dump might have
- Presence of surface water in the vicinity of the area
- Presence of sensitive ecological areas

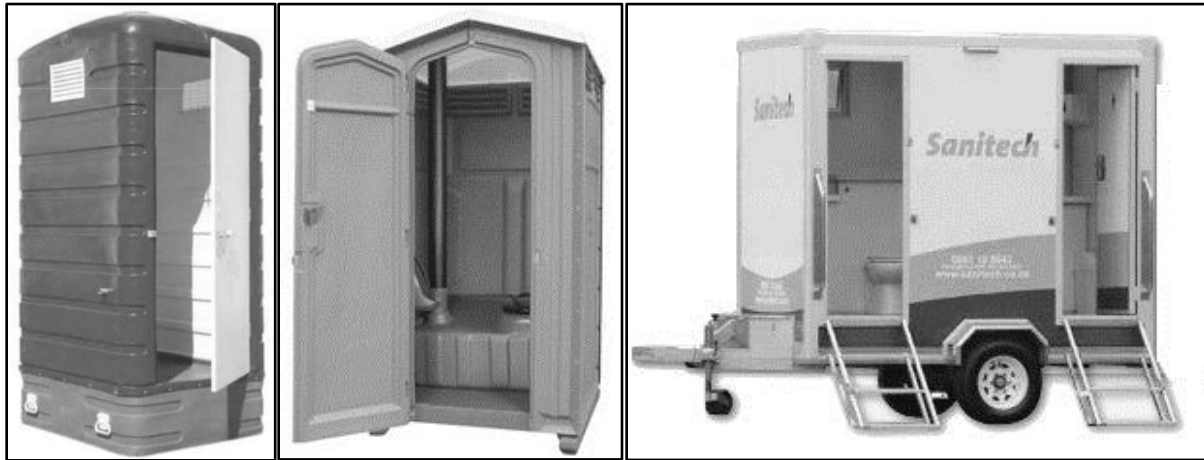
Since the area is located on privately-owned farms, all waste will be transported and disposed out of the area.

### **3.7 Sanitation**

Existing ablution facilities will be used by personnel if available and with consent from the landowner. Should activities be conducted in remote locations, appropriate toilet facilities must be



provided for use by personnel. Due to health and safety concerns, personnel may not relieve themselves in the surrounding bush.



**Fig. 7.** Toilet facilities similar to these to be made available on site.

### **3.8. Environmental Impact Assessment Requirements**

The Environmental Regulations procedure (GN 30 of 2012) stipulates that no exploration activities may be undertaken without an environmental clearance certificate. As such, an environmental clearance certificate must be applied for in accordance with regulation 6 of the 2012 environmental regulations. It is imperative that the environmental proponent must conduct a public consultation process in accordance with regulation 21 of the 2012 environmental procedure, produce an environmental assessment report and submit an Environmental Management Plan for the proposed exploration activities.

## **4. Description of Proposed exploration activities of the Project**

### **4.1. Introduction**

The EPL covers relatively a small area of about 1892.2808 Hectares and overall aim of the proposed project is to systematical search mineralization of economic potential. The EPL covers

mineral rights for Base & Rare Metals, Dimension stone, Industrial Minerals, Nuclear Fuels, Non-Nuclear Fuels as well as Precious Metals and the exploration strategy to be employed will take into account the already known mineralization potential and the probable potential on basis of tectonic history as well as the presence of favourable stratigraphic unit within the targeted area. The scale of proposed exploration activities to be undertaken will determine the scope of the required field-based support and logistical activities. During the exploration programme, all the staff members will be based in the town of Karibib and exploration crew transportation arrangements from Karibib to exploration sites will be provided by the proponent. Another available option would to look at the possibility of camping on site and of course with consent from the landowner or alternatively make use of available accommodation facilities on one of the farms if agreeable to the property owner. Existing tracks will be utilized to target sites. It will only in the absences of existing tracks, camping/ accommodation facilities will the field teams create new of the same in line with the EMP provisions and of course in consultation and with consent of the landowner/s. Exploration camps will have very limited footprints with a likelihood of expansion to accommodate test mining and mine development phases in an event of a discovery of a mineral resource with economic potential.

The initial stages of the exploration program to be implemented by the proponent as assessed in the EIA report will involve:

### **Description of activities to be undertaken**

The proposed activity will involve detailed exploration and reconnaissance for Nuclear Fuel Minerals. This will entail both non-invasive and invasive exploration methods as described below. Non-invasive exploration methods usually include remote sensing, geological field mapping, ground geophysical survey, surface sampling, etc. whereas invasive exploration methods include more destructive methods of exploration such as reverse circulation or diamond drilling and pitting/trenching. Non-invasive exploration activities will be undertaken first in order to define the

need for more invasive activities. Should the results from the non-invasive activities be positive the detailed site-specific drilling, trenching, and sampling will be undertaken.

**Exploration programme activities will include:**

- Geological mapping - Involves visual assessment of outcropping rocks: No environmental impact, no activity footprint to be left behind.
- Ground geophysical surveys—Handheld geophysical equipment or drones are utilized to collect data from subsurface rocks. This is achieved through traversing lithological units of interest: this process does not leave behind any environmental impact and activity footprint.
- Geochemical sampling –A small holes of roughly a few centimeters deep are dug from which sample/s are collected and the hole is then covered after sampling leaving no activity footprint left behind.
- Trenching—A trench is a ground excavation that generally deeper than its width and narrower than its length. Trenching is mainly for purposes of the orientation of the targeted lithology and mineralization as well as sampling. Impact is localized and the trenches are covered after sampling leaving to no activity footprint.
- Pitting - excavation or diggings of areas are done to obtain a representative bulk sample of the mineralization as well as getting a 3D view of the mineralization. Impact is also localized and the trenches are covered after sampling leaving to no activity foot print.
- RC and diamond drilling - Holes are drilled and drill samples collected will be used for geotechnical analysis and analysis of elements and minerals. Holes are capped after drilling and the drilling site for each hole is localized and rehabilitated after drilling.

Exploration activities will be performed in four phases within three years of the validity of the exclusive prospecting licence. The initial stages of the exploration program to be implemented by the proponent as assessed in the EIA report will involve:

## **4.2 Non-invasive exploration methods**

### **4.2.1 Desktop studies**

- Evaluation of satellite, topographic, land tenure, accessibility, supporting infrastructures.
- Purchase and analysis of existing government high resolution magnetics and radiometric geophysical as well as government aerial hyper spectral data.
- Data interpretation and delineating of potential targets for field- based activities.
- Purchase and analysis of any geological, geochemical data as well as remote sensing mapping and data analysis.
- Thematic mapping shall be done to delineate various land use zones and patterns to help improve the multiple land use practices and promote coexistence for all the possible land use options on the farms

### **Initial regional field-based activities**

- Regional geochemical sampling and regional geological mapping aimed at identifying possible targeted based on the results on results of the initial desktop studies.
- Laboratory analysis of the samples collected and interpretation of the results and delineating of potential targets for further detailed site-specific exploration activities.

### **Localized/ site specific field-based activities**

- Once more information on target areas is obtained, the EPL holder may undertake frequent verification/ mapping/ sampling visits/ trenching/ drilling, but this will only be over specific areas of interest and not the entire EPL.
- The only parts of the EPL to be physically visited for exploration purposes in most cases are areas of interest and these tends to be a localized involving only small areas where the mineralization occurs.

- Field verifications of targets will only be done with the permission of the landowner, and they will have knowledge of the exploration activities in the area/farm.
- It is very unlikely that the entire EPL will be an area of interest since this is never the case and it is very unlikely to happen with this EPL.
- Local geochemical sampling with the aim of verifying the prospectivity of the targets delineated during regional field-based activities.
- Local geological mapping aimed at identifying possible targeted based on the results of the desktop studies, regional geological mapping and analysis undertaken.
- Ground geophysical survey.
- Trenching, drilling, pitting, sampling.
- Laboratory analysis of the samples collected and interpretation of the results and delineation of potential targets

### **Prefeasibility and feasibility Studies**

The project may and can only advance in to mining if resources of economic potential are discovered. If the proposed exploration activities lead to a discovery of a mineral resource of economic potential, prefeasibility and feasibility studies will then be carried out over the local area hosting the mineralization. During the prefeasibility and feasibility studies, a detailed site-specific Environmental Impact Assessment (EIA) study will be carried out and an Environmental Management Plan (EMP) report will be prepared and these will be done in consultation with all interested and affected parties including the landowners. The process will involve the following:

- Detailed land surveys and detailed geological mapping.
- Detailed drilling and bulk sampling and testing for ore reserve calculations.
- Geotechnical studies for mine design.
- Mine planning and designs inclusive of all supporting infrastructures (water, power and access) and test mining activities.

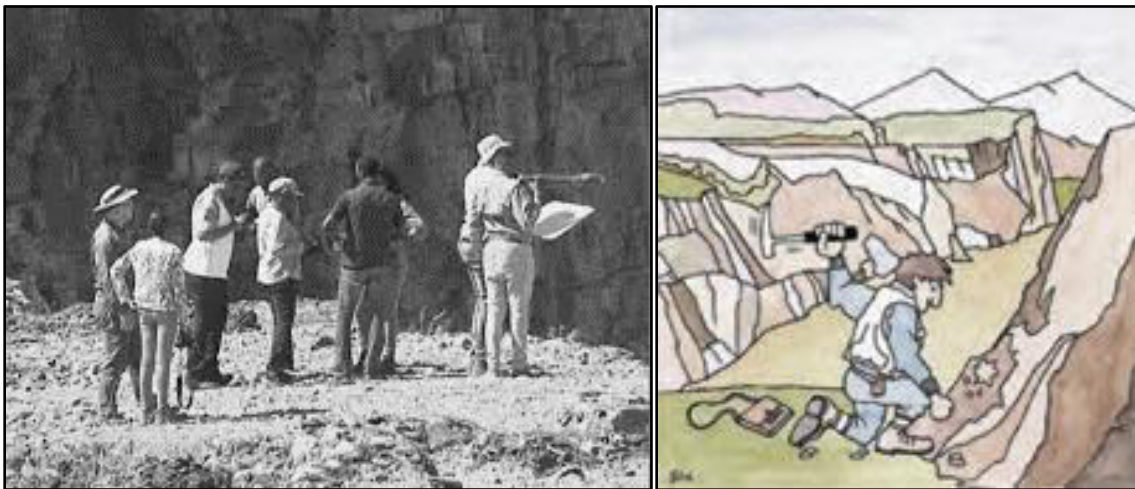
- EIA and EMP to support the ECC for mining operations. Preparation of feasibility report and application

### **Field exploration activities**

The current schedule for exploration activities on the EPL will run for three years subject to a two year renewal if the prospects are favorable. Activities will include geophysical surveys, drilling, geochemical sampling and pitting and trenching. The proponent plans to implement these activities as soon as the clearance certificate has been issued.

### **Geological mapping**

Geological mapping involves surficial traversing of lithological units to gather information on type outcropping lithological units, their orientations, taking coordinates of their contacts as recording of any feasible mineralization for production of localized maps. This process is non-invasive environmental wise and leaves no footprint behind.



**Fig. 8.** Geological mapping exercise underway (an environmentally non-invasive activity)

## **4.2.2 Geophysical surveys**

Geophysical surveys are by nature non-invasive to the environment and are primarily conducted to give an overview or a geological picture of the subsurface aimed at identifying underground areas that have mineralization potential in a given area. Various sensors are normally used during the surveys that may include radar, resistivity, magnetic, electromagnetic, etc. These surveys will be conducted in search of mainly metals and some industrial minerals using UAVs, air crafts or by means of ground surveys. The ground geophysical surveys are expected to be conducted over localized areas where potential is known to exist. The following sensors are likely to be utilized:

- Radiometric
- Resistivity
- Ground magnetics are conducted using a magnetometer
- Gravity surveys are conducted with the use of a relative gravimeter
- Electro-magnetic techniques

### **Radiometric**

Radiometric surveys (also known as Gamma ray spectrometry) are an airborne method which measures the amounts of natural radiation produced at the Earth's surface. Radioactive uranium, thorium and potassium minerals occur naturally in rocks, producing relatively high amounts of radiation which can be measured in contrast to the surrounding rocks. Due to gamma radiation only being able to penetrate several centimetres of earth/ground, the radioactive materials must be present in outcrops to be detected. However, through atmosphere, these rays can penetrate up to a couple of hundred metres, and so low-flying aircraft are useful in this method for covering large regional areas. Because the energy of gamma radiation received is distinctive of the specific element, it can be used to map uranium-thorium-potassium concentrations over wide areas. It is extremely important to note that these surveys measure levels of naturally occurring radiation in

the rocks, and the instruments themselves do not emit any radiation, making them harmless to both people and livestock.



Fig. 9. Geophysical survey being undertaken (an environmentally non-invasive activity)

### **4.3. Invasive exploration methods**

#### **4.3.1 Geo-chemical sampling**

Geochemical sampling involves the analysis of geological samples at an analytical laboratory. Samples taken during drilling and surveying will be sent away for analysis, specifically to determine the mineral composition and the level of base metals, namely copper and iron, within the samples. Samples are taken during drilling by either the geologists or geological assistants and can be in either rock, soil or drill core form.





**Fig. 10.** Geochemical sampling sites

#### **4.3.2. Pitting, trenching and excavations**

Pitting and trenching involve the mechanical or manual digging of small-scale pits and trenches in order to provide a soil profile. With regard to the activities within the EPL area, pitting will only occur should results come back positive for mineralization. It is anticipated that the average pit may roughly be 5m x 5m and 3m deep. Trenching is similar to pitting, except a trench will show a latitudinal profile across a longer horizontal access, it is designed to follow an ore body across the landscape. The expected average size of a trench maybe up to 500m x 1m and 2m deep. Excavations will involve opening up some parts of the mineral unit to get a closer look of the mineralization over a wide but localized area, which maybe roughly 2m by 2m.



Fig. 11. Trenching site and a schematic illustration of a trenching site.

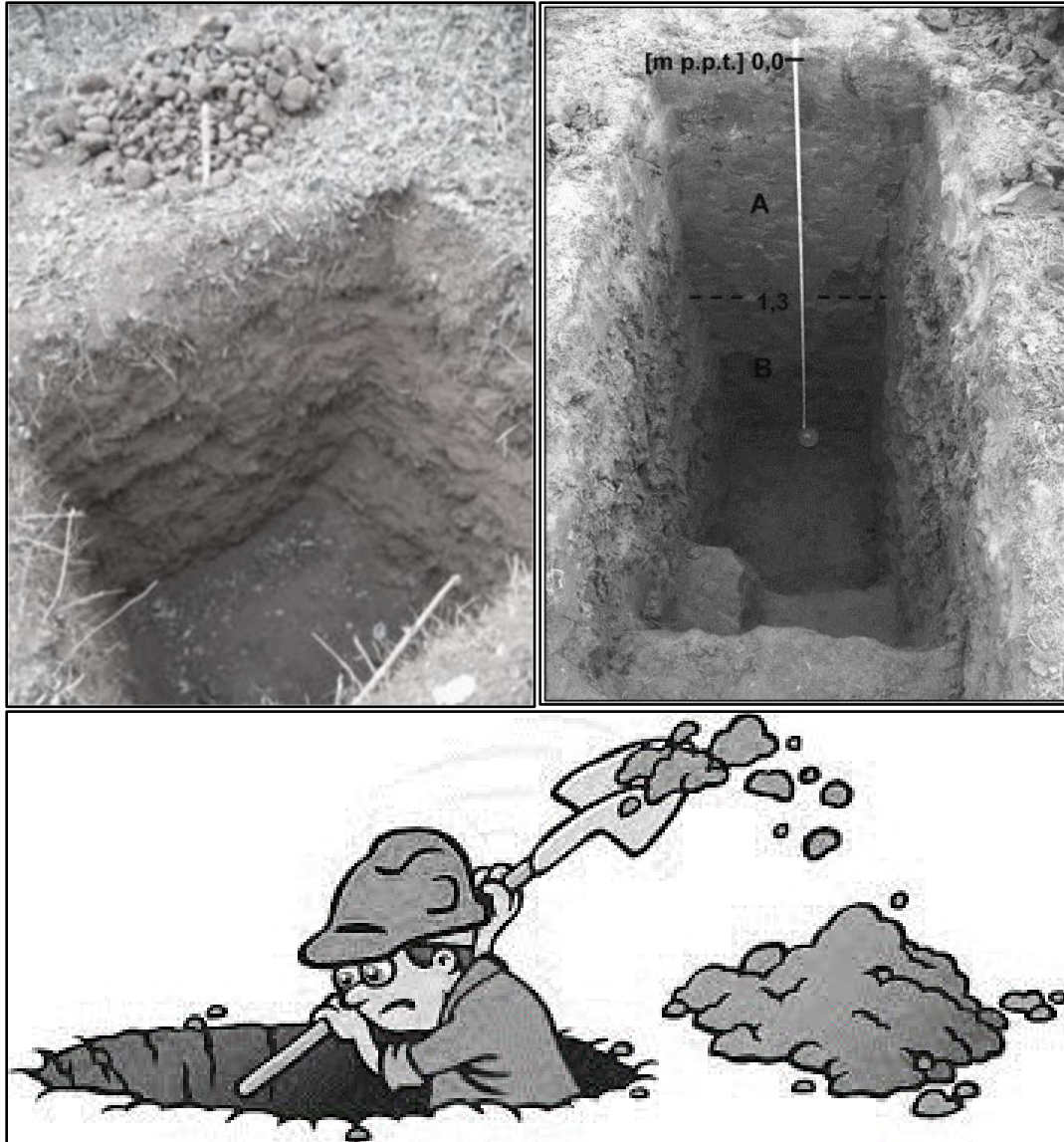


Fig. 12. Pitting sites

### 4.3.3 Drilling

Exploration drilling is the process which involves collection of subsurface rock samples from drill holes in areas suspected to have potential for mineralization. There are various drilling methods available, for this project the following methods will be utilized: reverse circulation drilling for metal mineralization search and diamond-core drilling for geotechnical assessments of the mineral.

The initial total number of meters to be drilled over the EPL will depend on the results of the initial exploration activities. Once sampling results are obtained, the areas of potential are narrowed down and closer spaced holes will be drilled in order to delineate ore-body. A typical drilling area will consist of a drill-rig, an area where the drill core and geological samples can be temporarily stored and a temporary storage area for drill equipment, fuel and lubricants. This area will be cordoned off and off limits to those not partaking in the exploration program.

### **Reverse Circulation (RC) drilling:**

The drilling mechanism is a pneumatic reciprocating piston known as a "hammer" driving a tungsten-steel drill bit. RC drilling utilizes much larger rigs and machinery and depths of up to 500m are routinely achieved. RC drilling ideally produces dry rock chips, as large air compressors dry the rock out ahead of the advancing drill bit.

### **Diamond-core Drilling:**

Diamond core drilling uses an annular diamond-impregnated drill bit attached to the end of hollow drill rods to cut a cylindrical core of solid rock. Holes within the bit allow water to be delivered to the cutting face. This provides three essential functions — lubrication, cooling, and removal of drill cuttings from the hole. Diamond drilling is much slower than reverse circulation (RC) drilling due to the hardness of the ground being drilled. Drilling to a depth 600 meters is common and at these depths, ground is mainly hard rock.

Diamond rigs can also be part of a multi-combination rig. Multi-combination rigs are a dual setup rig capable of operating in either a reverse circulation (RC) and diamond drilling role (though not at the same time). This is a common scenario where exploration drilling is being performed in a very isolated location. The rig is first set up to drill as an RC rig and once the desired meters are drilled, the rig is set up for diamond drilling. This way the deeper meters of the hole can be drilled without moving the rig and waiting for a diamond rig to set up on the pad.



Fig. 13. RC and diamond drilling rigs at work also shown is drill core (activities are very localized with limited footprint).

## **5. Description of the receiving environment**

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### **5.1 Socio-Economic Environment**

According to the 2011 Namibia Population and Housing Census results, Erongo Region had a population of 150,809 people of which 70,986 were women and 79,823 were men. The region's population was growing at an annual rate of 3.4 percent. Most of the population lived in urban areas (87%) compared to only 13 percent in rural areas. This is due to a large proportion of migration from rural to urban areas in search of job opportunities in towns, particularly among young adults. The main languages spoken at home in the Erongo Region are the Oshiwambo language at 39% Afrikaans language at 20%; Nama/Damara at 19% and Otjiherero language at 10%. Erongo Region comprises of (7) constituencies, namely: Arandis, Daures, Omaruru, Karibib, Swakopmund, Walvis Bay Rural and Walvis Bay Urban EPL 8741 falls within the Karibib Constituency. The total area of Karibib Constituency covers 14 521 km<sup>2</sup> amounting to 22.9 percent of the total area of Erongo Region. Karibib Constituency is among the least densely populated area in Erongo Region with a population density of approximately 0.9 persons per km<sup>2</sup>. Karibib Constituency population statistics is displayed below.

#### **5.1.1 Demographics of the Karibib Constituency,**

The EPL 8741 falls within the Karibib Constituency, Erongo Region in Namibia. The total area of Karibib Constituency covers 14 521 km<sup>2</sup> amounting to 22.9 percent of the total area of Erongo Region. Karibib Constituency is among the least densely populated area in Erongo Region with a population density of approximately 0.9 persons per km<sup>2</sup>. The proposed project site is located 90 km SSW of Karibib town in the Erongo Region. The Karibib constituency had 13,320 inhabitants in 2011 and demographic statistical data of the Karibib Constituency is summarized in [Table 2](#). Karibib is the district capital of the Karibib electoral constituency with an urban population of 5,132 according to the 2011 population census. It is situated on the Karibib River, near Erongo

mountain. The town is located on a paved road between Swakopmund and Otjiwarongo. Karibib is connected to the Trans Namib railway network. As of 2020 Karibib constituency had 9,617 registered voters.

Table 2: Statistics of Karibib Constituency.

Karibib constituency statistics	
Population	13,320
Male	6, 908
Female	6, 412
Private households	3, 471
Population under 5 years	13 %
Population aged 5 to 14 years	20 %
Population aged 15 to 59	60 %
Population aged 60+ years	7 %
Female: male ratio	100: 118
Female head households	37 %
Male head households	63 %
People with disability	2 %
Employed population	59 %
Unemployed population	41 %
Retired population	49 %
Literacy rate 15 + years, %	92 %
Household income from pension	13 %
Household income from business and non-farming activities	9 %
Household income from farming	6 %
Household income from cash remittance	7 %
Household income from wages and salaries	58 %

### 5.1.2 Employment within the Erongo Region and Karibib town

Farming is the main source of income in this town, while other people operate their own businesses. Small scale mining, have created additional jobs for the inhabitants of this town. About 70% of the Erongo Region population is employed while 30% are unemployed. The inactive

group, which consists of homemakers 11%, students 46% and the severely disabled, retired or old age income recipients 35% makes up of the regions' population.

### **5.1.3 Social Economic Impact**

The project has great potential to improve livelihoods and contribute to sustainable development within the surrounding community. Once the project is developed into a mining operation, it has potential employment of 15 to 25 people during the mining stage. Community meetings will be held from time to time by the proponent wherever possible, with the purpose of effectively communicating with the local community and to avoid any unexpected social impacts.

### **5.2. Current Land Uses**

The general land use of the proposed EPL area is mainly dominated by agriculture (cattle and small stock farming, hunting) and mineral (mineral and granite) exploration and mining. The game farms offer visitors the opportunity to be close to nature with a variety of tailor-made tourism products such game viewing, trails and hunting activities. The game farms are also important conservation areas for endemic and protected flora and are sanctuaries for endangered faunal species. The summary of other land uses activities found in the general areas includes: tourism, conservation, prospecting and small-scale and large-scale mining and quarry operations are common within the Karibib constituency.

### **5.3. Climatic Conditions**

The project area is relatively a dry and hot place with the lowest average low temperature of 14°C recorded in August and September. The highest average high temperature of 23.5°C is recorded in April. The area receives little rainfall during the wet season with an average annual rainfall of about 42 mm. The lowest relative humidity of 54% is in July, with January being the most humid month with relative humidity of 78%.



### **5.3.1. Temperature**

The project is located in a tropical to subtropical desert climate. Due to a shortage of water, there is less vegetation growing in the project area. The coldest temperatures are typically encountered between August and September, with the lowest average low temperatures being at 14°C. The highest average high temperature of 23.5°C is recorded during the month of April. Annual average temperatures in Namibia and monthly temperature averages in the project area are given in Figures below.

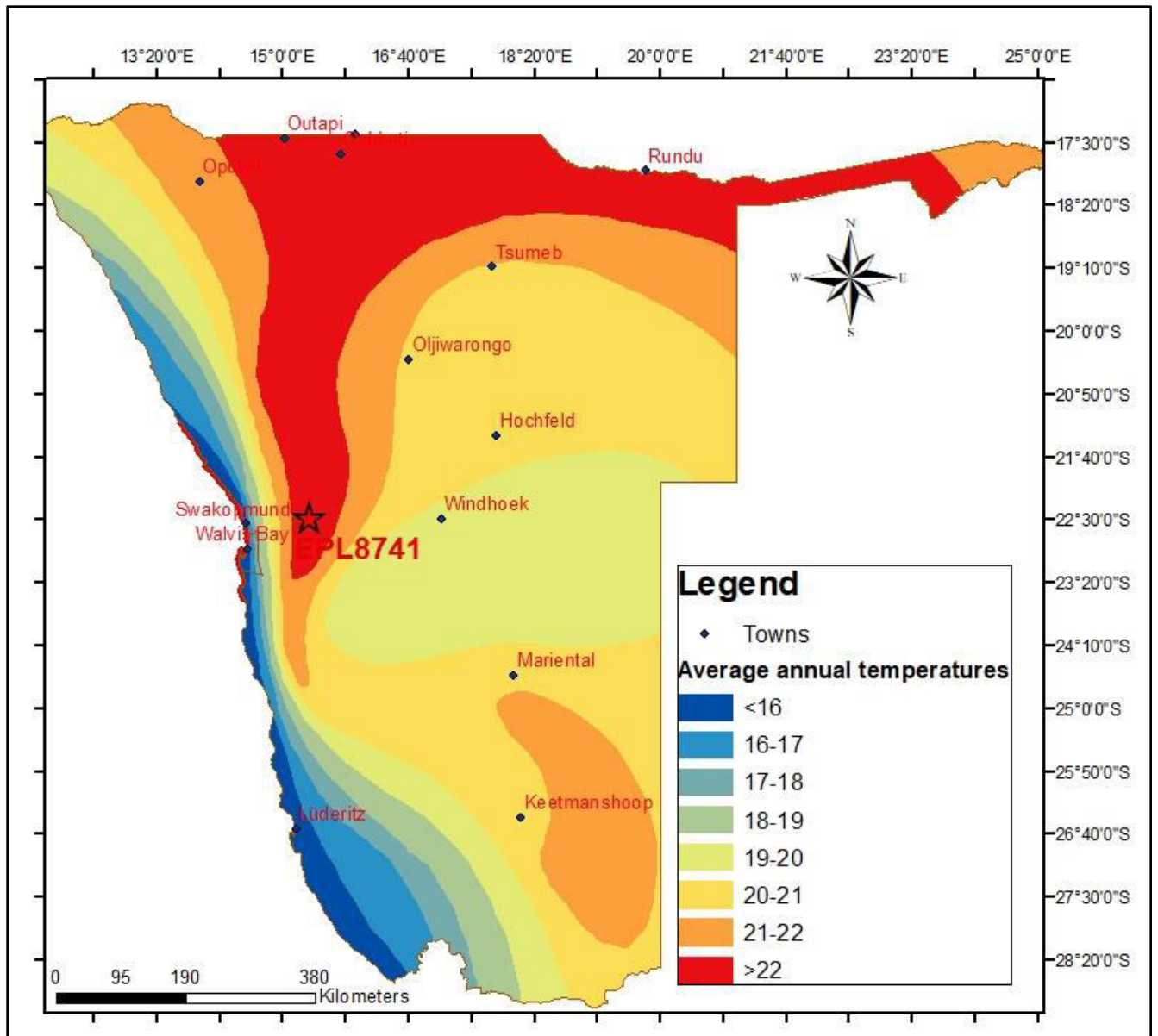


Fig. 14. Average annual temperature in Namibia (ACACIA, 2002).

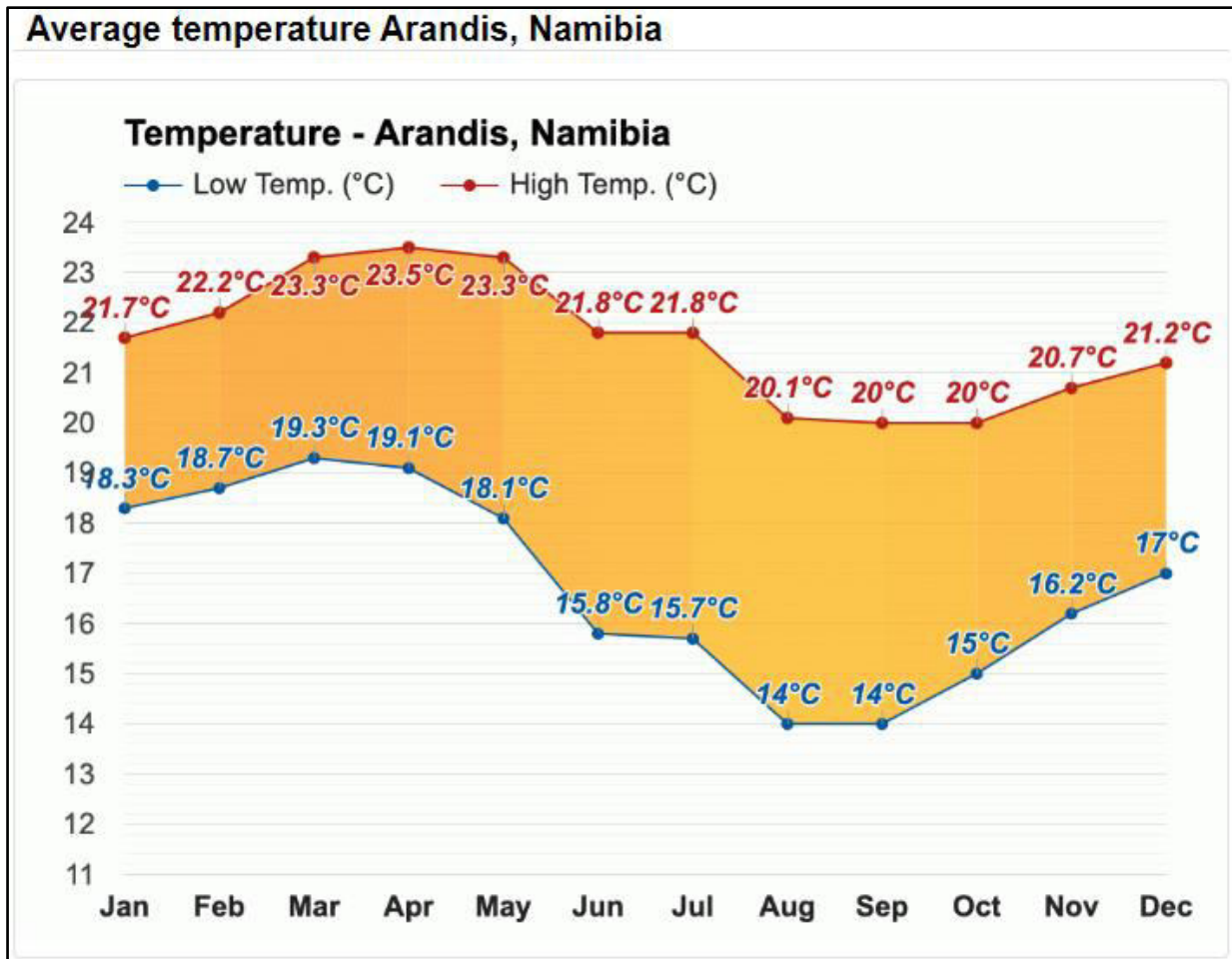


Fig. 15. Temperature graph for Arandis and the surrounding areas (weather-atlas, 2022).

### 5.3.2. Precipitation

The project area receives summer rainfall of which >66% of the rain is received between October and March of each year. The highest precipitation in the area occurs between January to April, with highest rainfall received in February and March with an average 10mm. The month with the highest number of rainy days is March (5.7 rainfall days). The month with the least rainy days is August (0.2 rainfall days). The graph below shows the rainfall patterns in the proposed project area. The area experiences semi-arid climatic conditions with an average rainfall of 42 mm per annum. Annual average potential evaporation rate far exceeds average annual rainfall and net water deficit conditions prevail as shown in the maps below. The driest months (with the least rainfall) are June, July and August recording 0mm of rain. Annual average rainfall, annual

evaporation, water deficit maps for Namibia and monthly rainfall averages for project area are given in figures below.

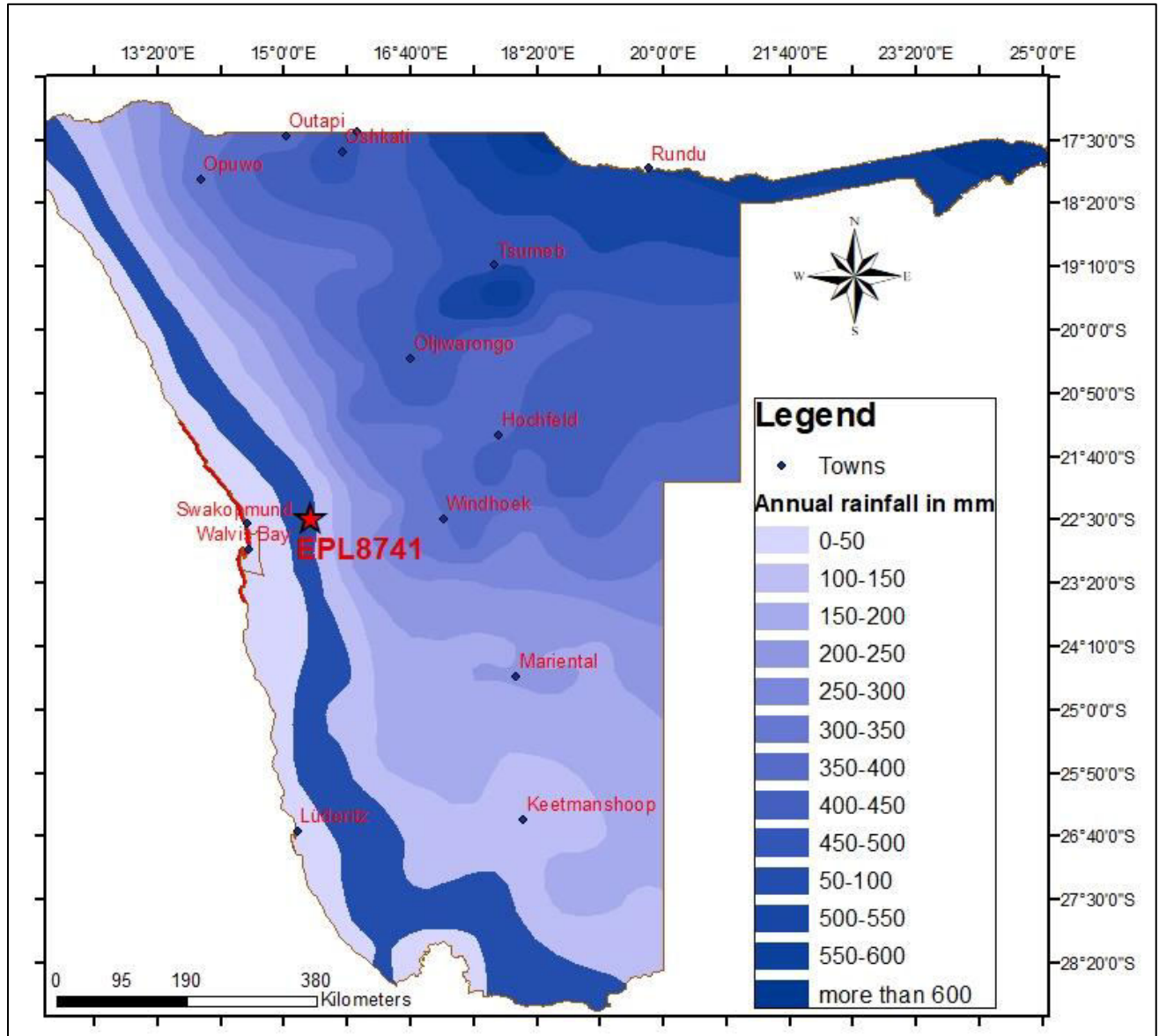


Fig. 16. Average annual rainfall in Namibia (ACACIA, 2002).

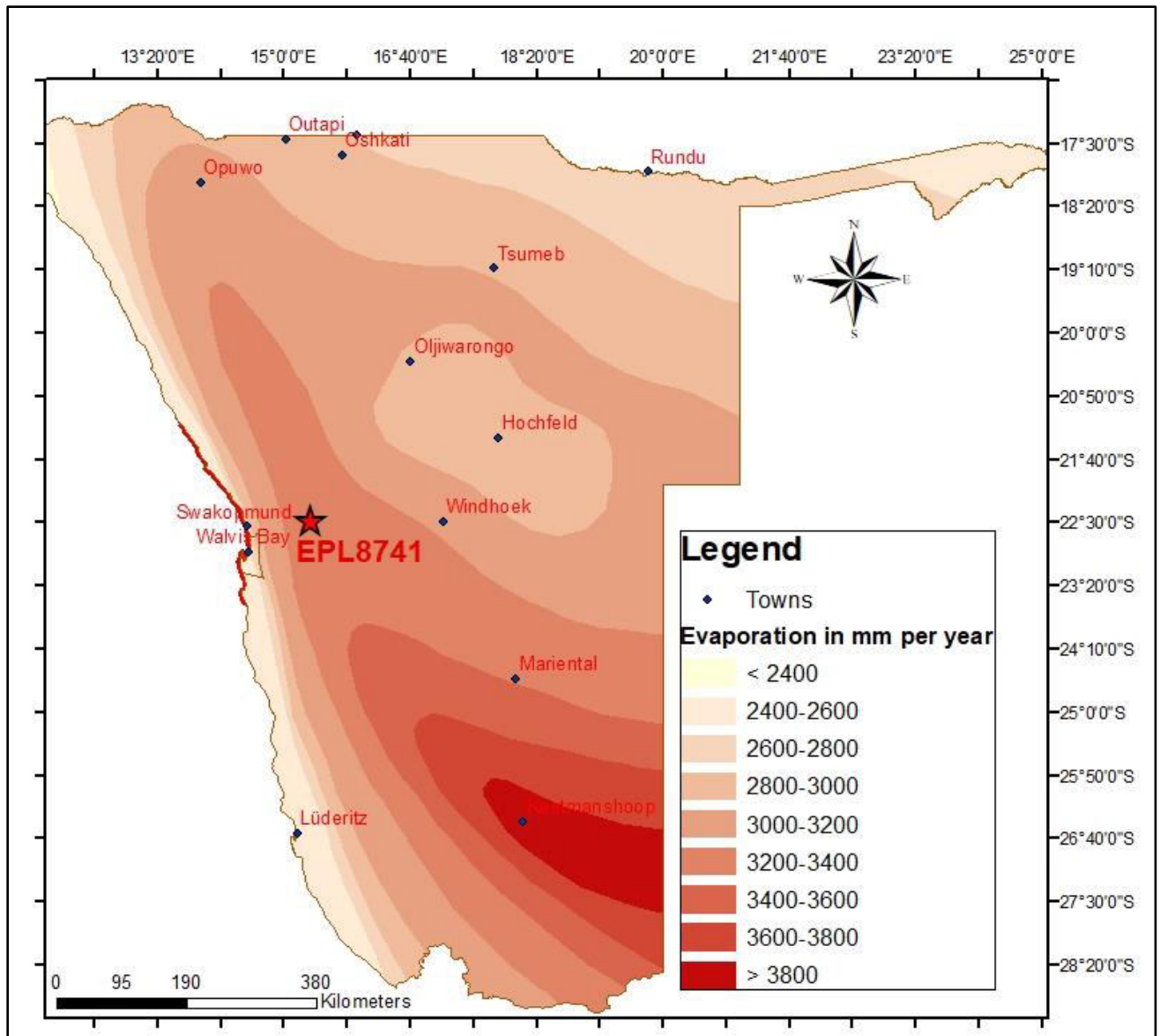


Fig. 17. Annual evaporation in mm (ACACIA, 2002).

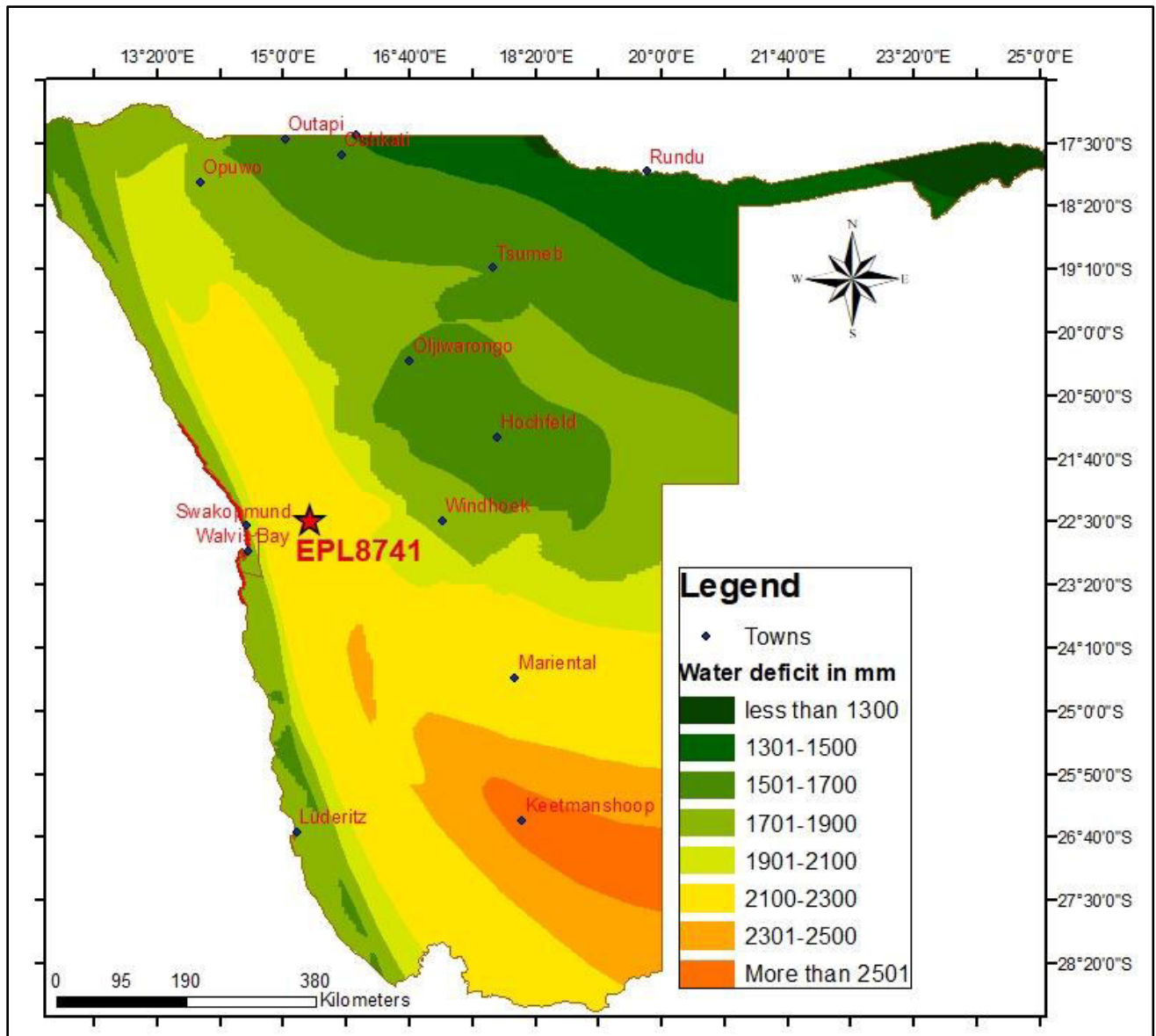


Fig. 18. Measured water deficit in mm (ACACIA, 2002).

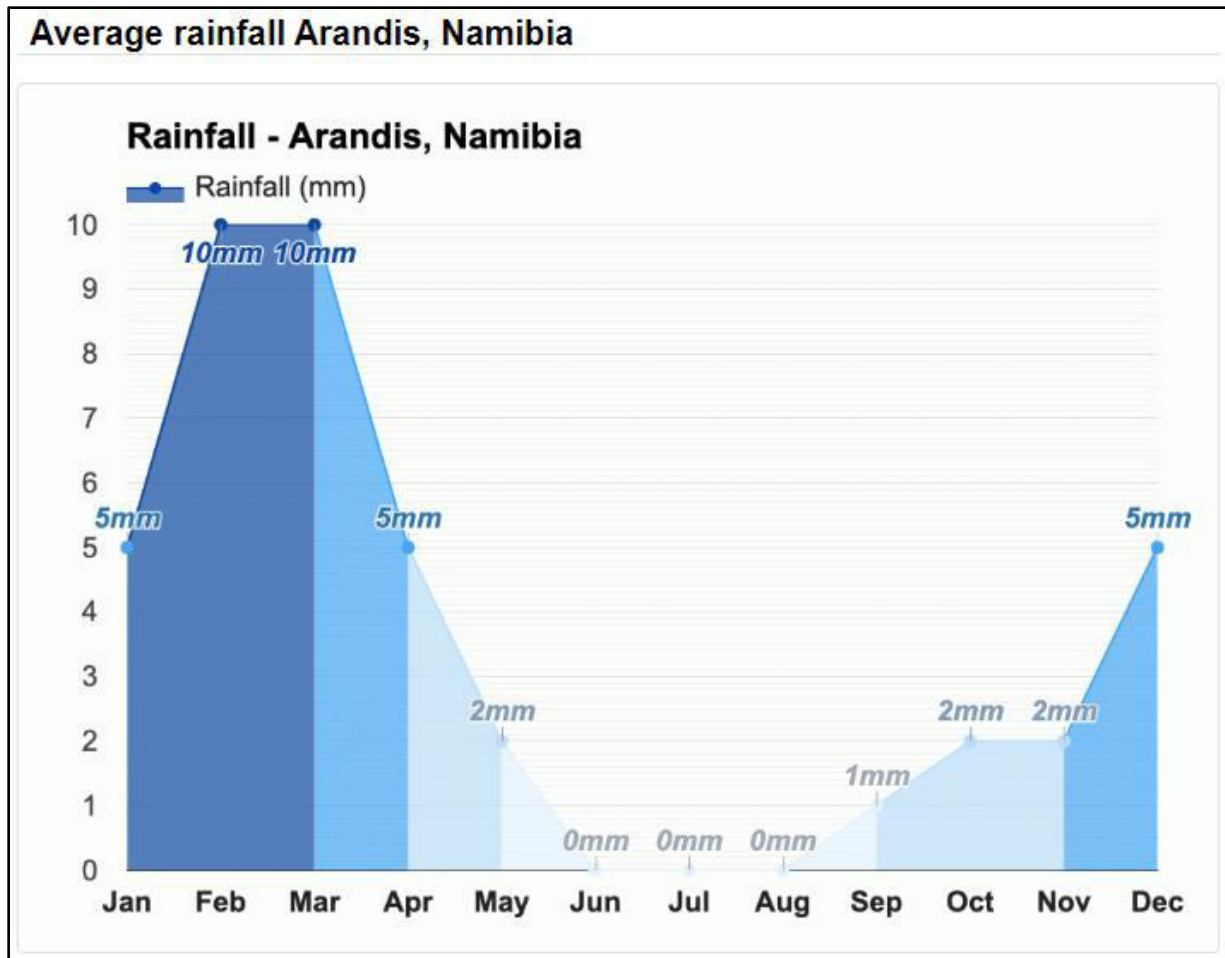


Fig. 19. Rainfall graph for Arandis and surrounding areas (weather-atlas, 2022).

### 5.3.3. Wind

The predominant average hourly wind direction varies throughout the year in Arandis and the project area. The wind is most often from the east for 7 months, from June to December with October being the windiest month with an average peak speed of 17.7 km/h. From March to May the average wind speeds range from 15.8 to 15.9 km/h and the calmest months are January and February with average wind speeds ranging between 14.3 and 14.6 km/h. The lowest average wind speed is in January when it averages 14.3km/h. Monthly average wind speeds for project area are graphically represented below.

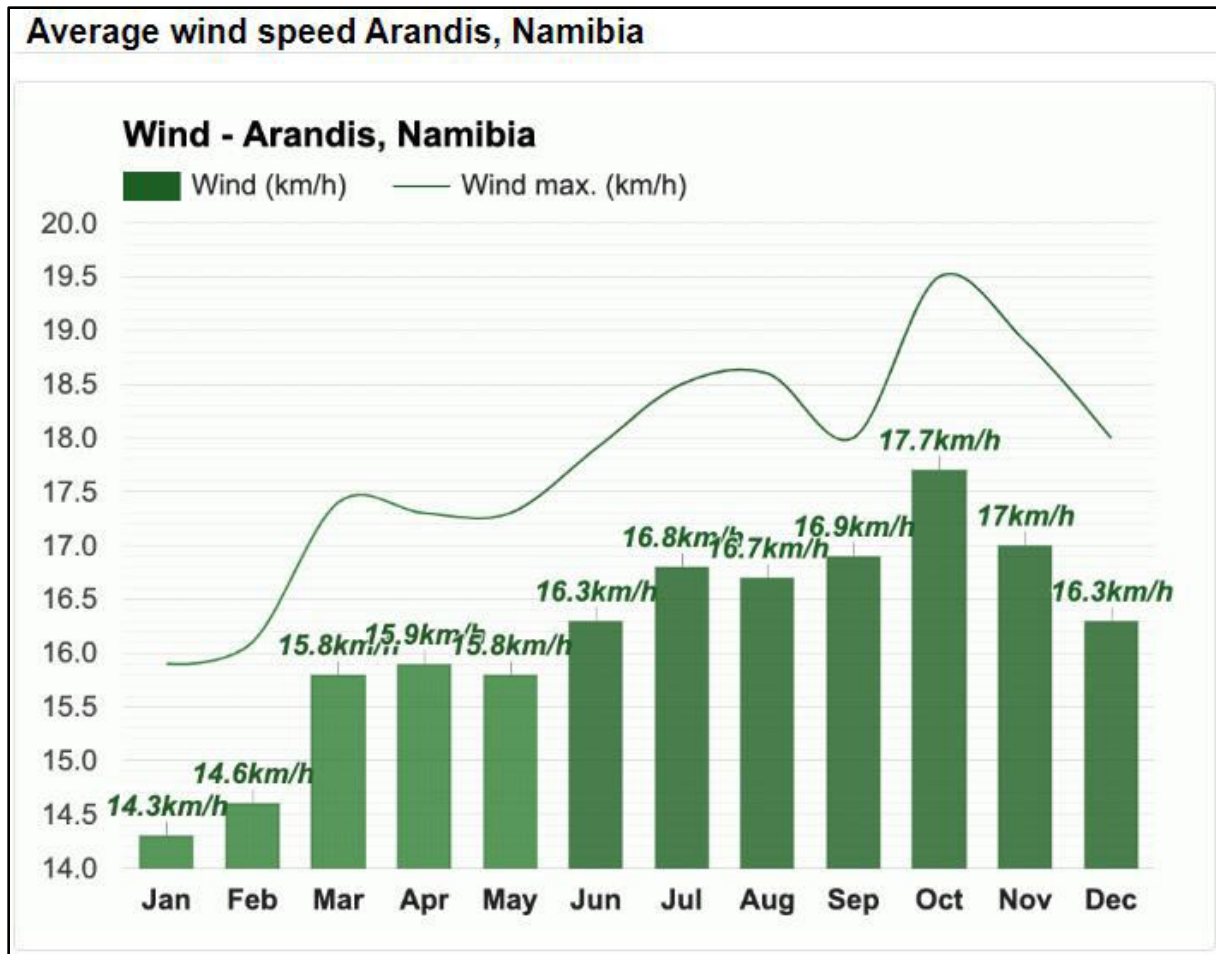
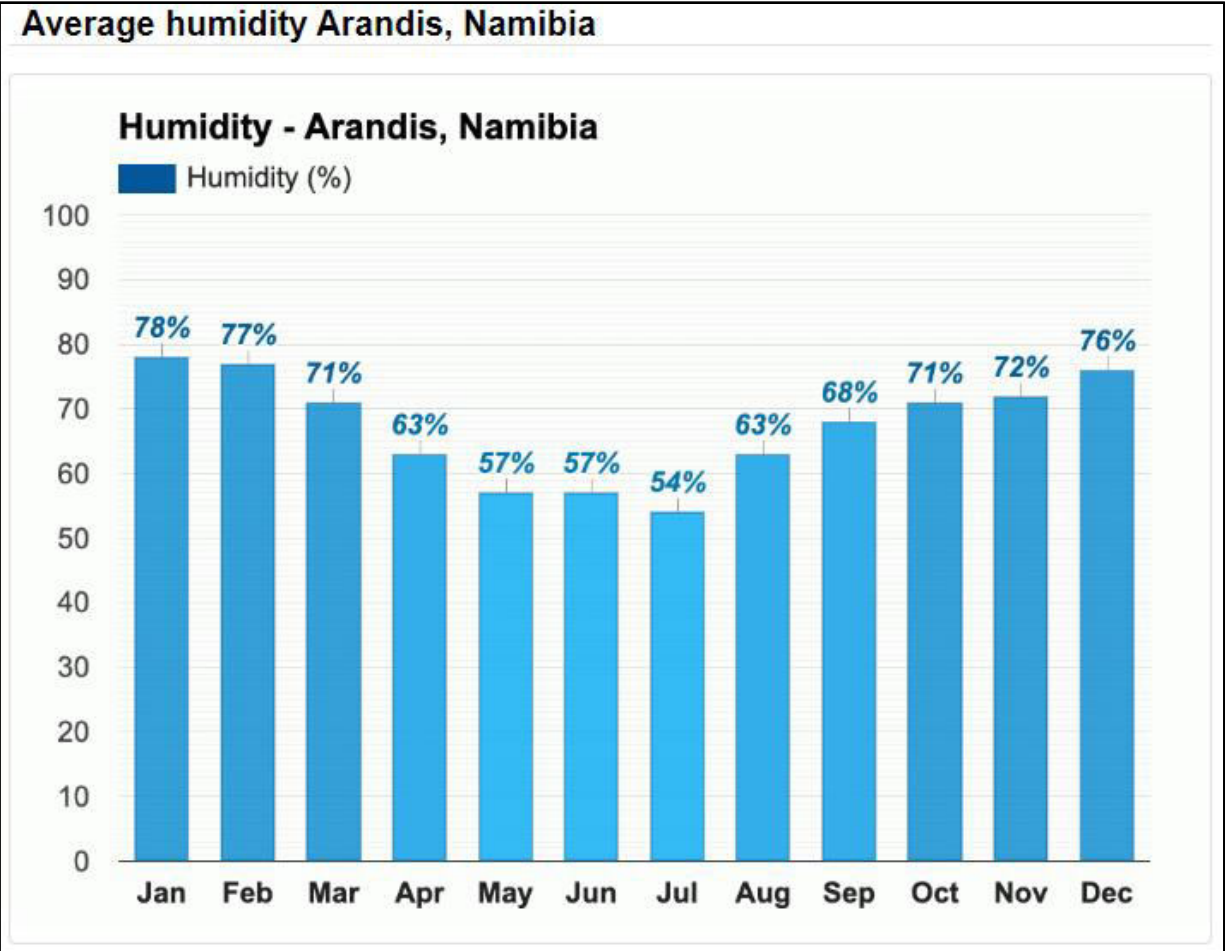


Fig. 20. Wind graph for Arandis and surrounding areas showing maximum and average wind (weather-atlas, 2022).

### 5.3.3.1 Humidity

The relative humidity during the least humid months of the year, i.e. May to July, is between 54 and 57 %. Relatively, high humidity is experienced during October to March, when it ranges between 71 and 78% with the most humid month being January with 78% humidity. Areas close to the Namibian coast have high humidity in general due to fog and this causes low visibility at time. During the month of April and August to September, the humidity ranges from 63 to 68%. The average monthly humidity of the project area and the surrounding is given in the figure below.





**Fig. 21.** Humidity graph for Arandis and surrounding areas showing average monthly humidity percentages (weather-atlas, 2022).

### 5.3.3.2. Air Quality

Data from accuweather.com shows that the air quality in the area is generally excellent with an air quality index of 16 AQI. The ground-level ozone (O<sub>3</sub>) is about 16 µg/m<sup>3</sup> which is excellent. The fine particle matter levels (PM 2.5) are about 7µg/m<sup>3</sup>. The particle matter (PM10) is about 4 µg/m<sup>3</sup>. The nitrogen dioxide (NO<sub>2</sub>), carbon monoxide (CO), and Sulphur dioxide (SO<sub>2</sub>) levels in the area are recorded to be 0 µg/m<sup>3</sup>. Probable sources of air pollution in the area are emissions and dust from vehicles travelling on gravel roads, dust generated by cattle grazing and wind erosion from the exposed areas.

## 5.4 Geology

### 5.4.1 Regional geology

The project area is within the Damara belt which forms part of the Pan-African collision belts in southern Africa representing the formation of the Gondwana supercontinent (Miller, 2008). The Damara Orogen is a Neoproterozoic orogen consisting of three arms, the NNW-trending coastal arm (the Kaoko Belt) extending into Angola, the NE-trending arm (the Damara Belt) which extends through central Namibia, across Botswana to the Zambezi belt (Miller, 2008), and the Gariiep Belt to the south extending into north-western South Africa. The Kaoko, Damara and Gariiep Belts evolved through phases of intra-continental rifting, spreading, subduction and continental collision lasting from approximately 800 or 900 Ma to ~460 Ma. In the Damara Belt, the Kalahari Craton was sub ducted beneath the Congo/Angola Craton and continental collision is dated at ~542 Ma (Miller, 2008).

The project area is in the NE-trending, Damara orogenic belt which has been divided into several different zones on the basis of stratigraphy, metamorphic grade, structure, geochronology, plutonic rocks and aeromagnetic expression (Miller, 1983, 1998). The zones are separated by tectonic lineaments, and these are, from north to south: the Northern Platform (NP), Northern Margin Zone (NMZ), Northern Zone (NZ), Central Zone (CZ), Southern Zone (SZ), Southern Margin Zone (SMZ) and the Southern Foreland (Fig.22). The Central Zone is divided into northern (nCZ) and southern (sCZ) zones. The Okahandja Lineament zone (OLZ) is routinely regarded as part of the SZ (Miller, 2008). EPL 8471 is located in the sCZ, approximately 90 km SSW of the town of Karibib (Fig. 22). The regional geology of the central zone of the Damara belt, where the prospect is located, is characterised by mainly mineral, schist and quartzite of the Swakop and Nosib groups of the Damara Super group (Fig. 23).

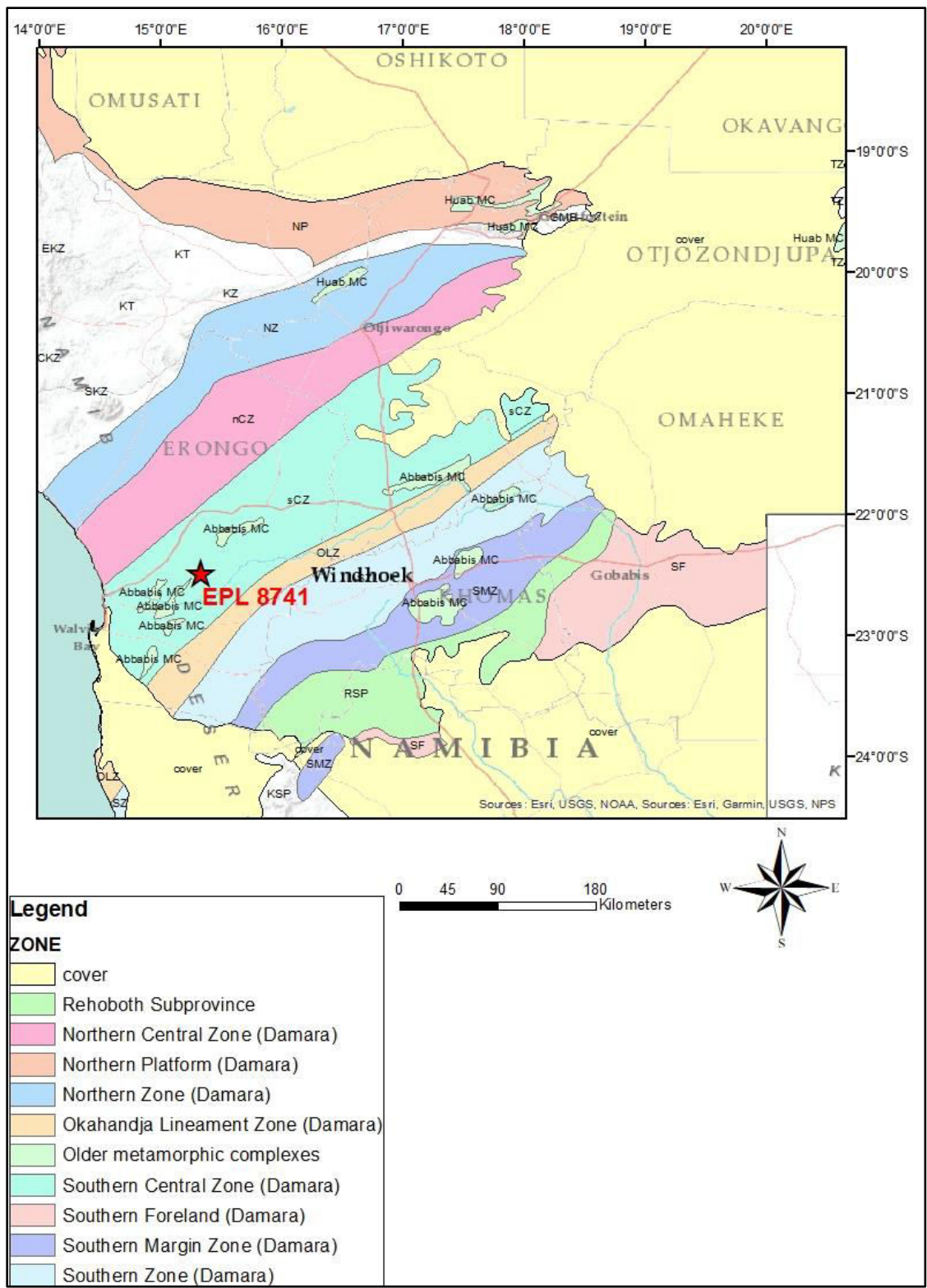


Fig. 22. Tectonic zones of the Damara orogenic belt. (Shape files are from the Geological Survey of Namibia). EPL 8741 is located in the northern central zone (sCZ) of the Damara belt.

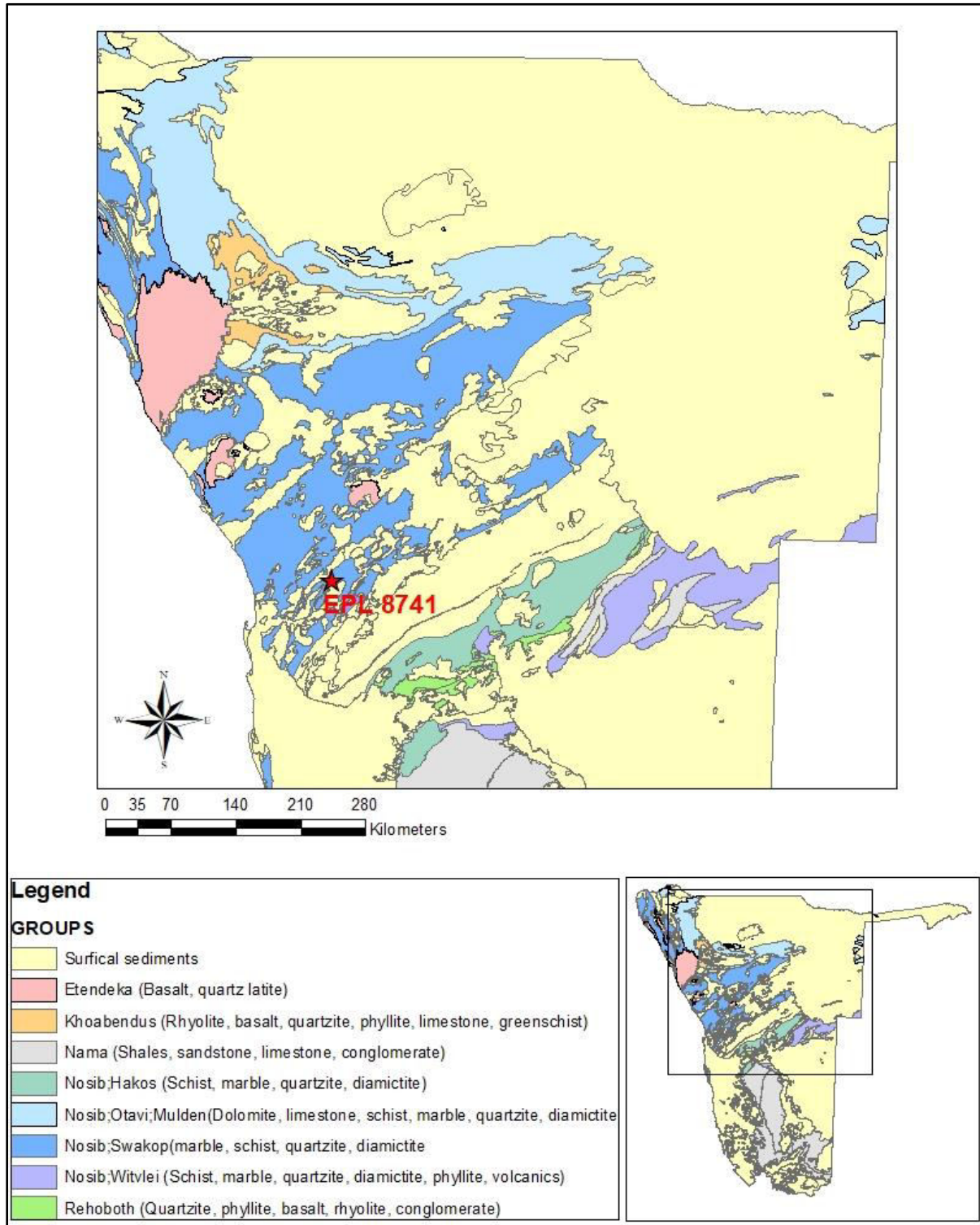


Fig. 23. Regional geology of central Namibia covering the project area is located. (Shape files are from the Geological Survey of Namibia).

The regional geology of the central zone of the Damara belt, where the prospect is located, is characterised by mainly mineral, schist and quartzite of the Swakop and Nosib groups of the Damara Supergroup. The central zone (Fig. 23) of the Damara Belt is a high-temperature, low-pressure zone with metamorphic grade increasing from middle amphibolite facies in its eastern parts to lower granulite facies in its western parts (Miller, 2008). The northern (nCZ) and southern central (sCZ) zones are separated by the Karibib lineament to the west and the Waterberg fault in the east. In terms of lithology, the central zone is characterized by mainly schist, mineral and quartzite of the Swakop and Nosib groups of the Damara sequence with numerous syn- to post-tectonic granitic plutons. The zone is also typified by major magnetic lineaments (Welwitschia and Erongo) and minor magnetic lineaments (Abbabis and Otjikoto). Peak regional metamorphism in the central zone (CZ) is syn-D<sub>2</sub> and occurred at ~520 Ma (Haack *et al.*, 1980; Miller, 1983). On the other hand, Miller (2008) places the peak of post-tectonic M<sub>2</sub> regional metamorphism throughout the Damara belt at 535 Ma.

#### 5.4.2 Stratigraphy

The EPL area falls within the Central Zone of the Damara Sequence (Fig.22). The oldest rocks within the Central Zone are the pre-Damara basement (Nosib Group) which was deposited or laid down in marginal to intra-continental rifts, consists of gneiss, quartzite, arkose, conglomerate, phyllite, calc-silicate, subordinate, limestone and evaporitic rocks. The sequence was deposited during successive phases of rifting, spreading, subduction and continental collision (Miller, 2008). Much of the basal succession is Nosib Group, the Karibib formation which hosts the targeted mineral overlies the Arandis Formation and underlies the Kuiseb Formation. The partial stratigraphy of the Central zone as in Miller (2008) as given is given in Table 3.

Table 3: Partial Lithostratigraphy of the Damara Sequence in Central Namibia (after Miller, 2008).

Group	Subgroup	Formation	Lithology
Swakop	Navachab	Kuiseb	Mica schist, mineral, quartzite, minor amphibolites schist, biotite schist
		Karibib	Mineral, schist, calc-silicate, dolostone, limestone, quartzite
	Usakos	Arandis	Schist, calc-silicates
		Chuoss	Diamictite, schist, minor quartzite
	Ugab	Rossing	Mineral, biotite schist, quartzite, gneiss
	Nosib	Khan	Gneiss, quartzite, conglomerate, schist, minor mineral, amphibole, calc-silicate
Etusis		Quartzite, gneiss, biotite schist, conglomerate	

### 5.4.3 Local Geology

The EPL application area consists of feldspathic quartzite and metarkose of the Etusis Formation overlain by the marble, dolostone and limestone of the Karibib Formation which in turn is overlain by mica schist of the Arandis and Kuiseb Formations (Fig. 24). Quaternary age sediments composed of sand, gravel and calcrete cover extensive portions of the EPL application area (Fig. 24).

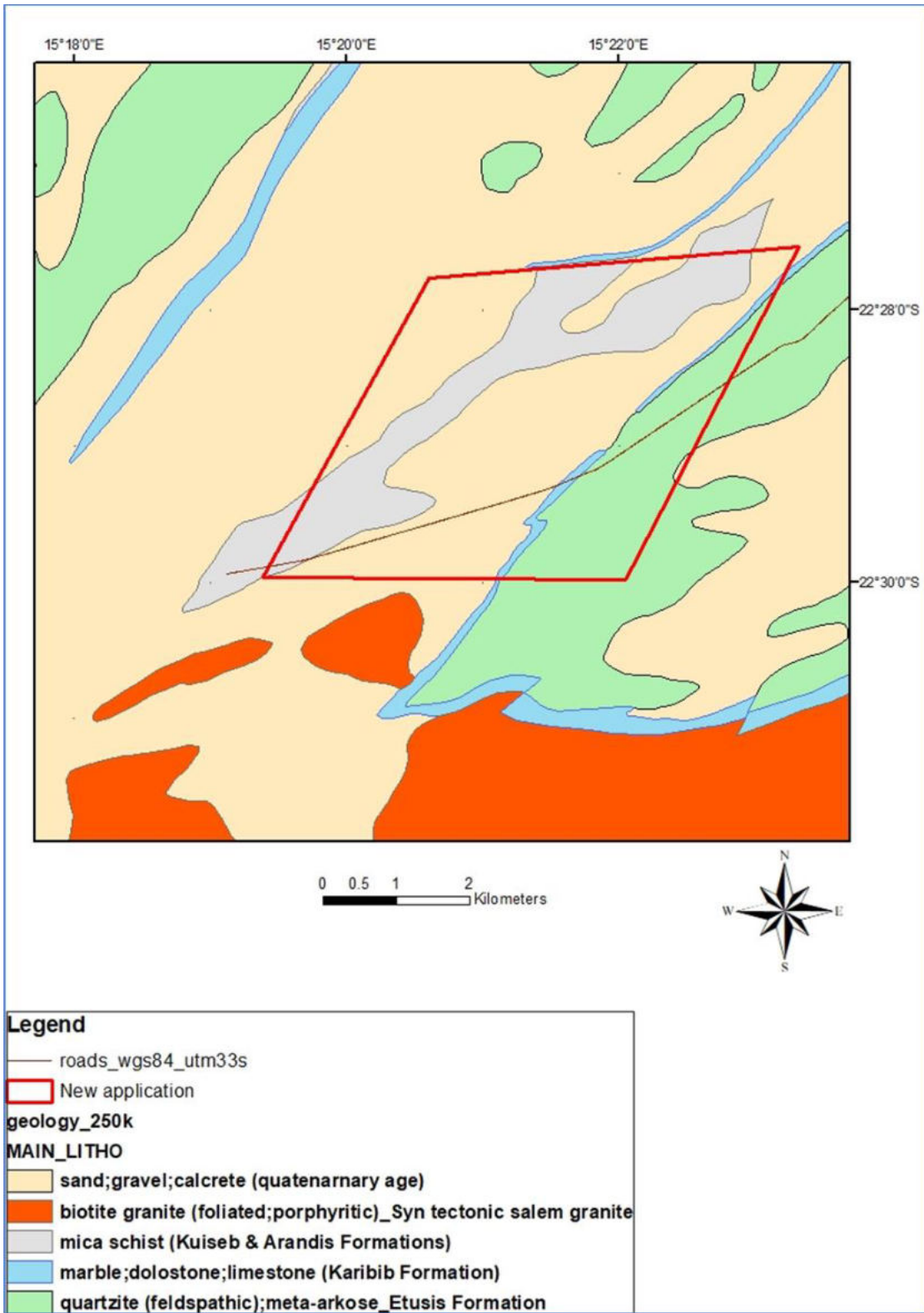


Fig. 24. Detailed local geology of the EPL area.

## **5.5. Hydrogeology and hydrology**

The project area is fall within the region with little or no ground water (Fig. 25). The EPL forms part of Karibib river catchment area. Permission for borehole drilling, groundwater abstraction will be obtained from the Ministry of Agriculture, Water and Land Reform (MAWLR) shall the need for groundwater uses arise. Groundwater in the area is associated with the good secondary hydraulic properties of the limited surficial covers and extensive carbonate deposits.



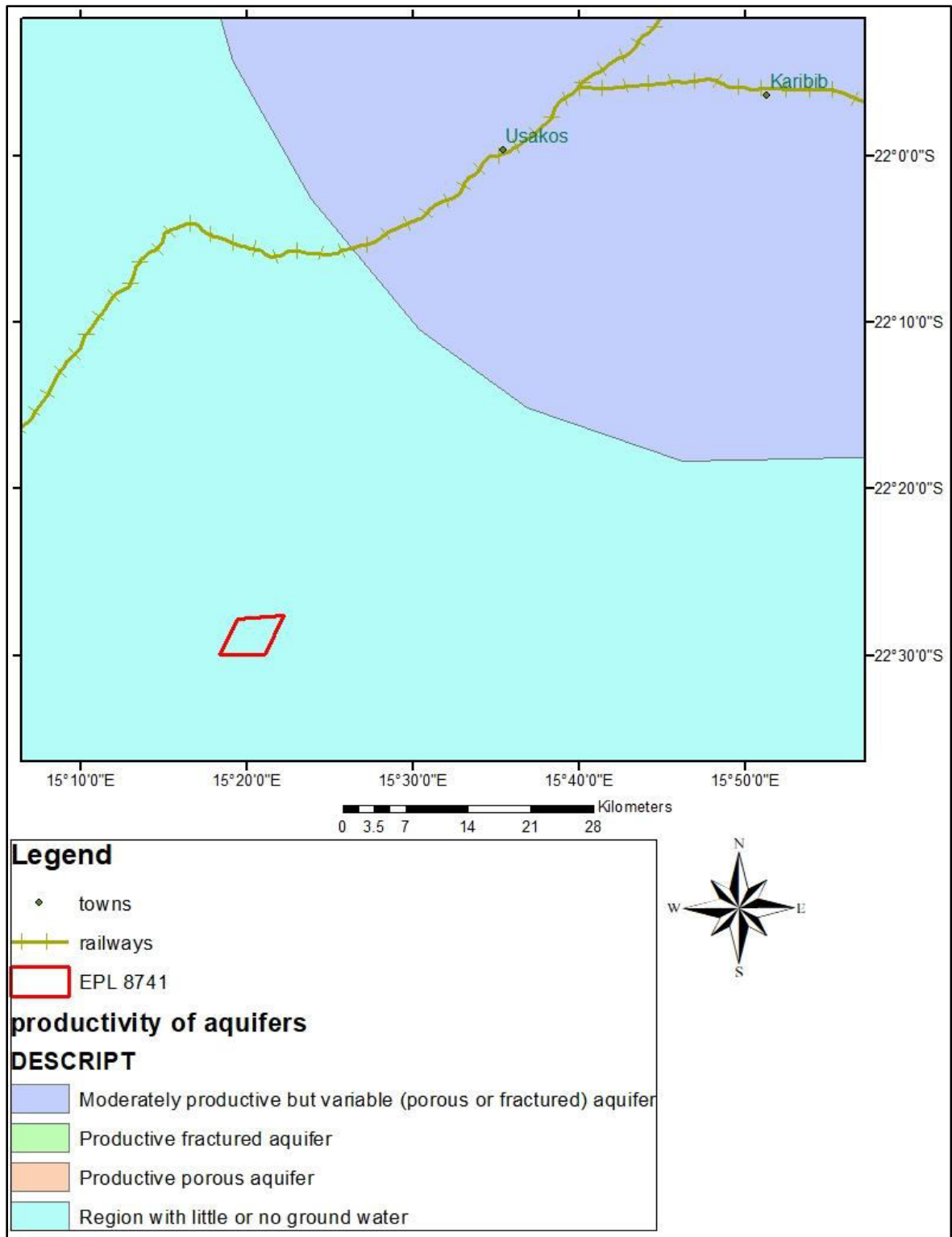


Fig. 25. Hydrogeological Map of the project area. The project area is fall within the region with little or no ground water.

## 5.6 Fauna and flora

As with all developmental projects in pristine areas impacts on fauna and flora are inevitable as such identification of high-risk habitats prior to commencement of the proposed activities coupled with environmentally acceptable mitigations will lessen the severity of the overall impact. An impact assessment of the proposed exploration on fauna and flora was carried out during the site visits conducted in June 2022. A thorough assessment was carried out within the Exclusive Prospecting Licence area (EPL 8741) by means of field observations, recording and data collecting. Some of the information is based on a detailed literature review. The purpose of the Fauna and flora literature review is to identify all potential amphibians, reptiles, mammals and plants expected in the project area and the surrounding farms in the vicinity of the EPL. The proposed exploration area supports numerous faunal species but there are no species that are exclusive to the study area.

Larger types of animals such as zebras, giraffes, lions and elephants are rare in this area. There are no species which are exclusively endemic to the exploration area. Based on literature review, implementation of the proposed exploration program in the area will not have a negative impact on any of the species in the project area. Further flora assessment was enhanced with the use of a species lists of plants occurring within the quarter degree squares which was extracted from the database, Botanical Research and Herbarium Management System which is found at the National Botanical Research Institute in Windhoek.

The project area falls within subtropical and tropical desert climate, characterized as dry and hot with occasional rainfall. Due to a shortage of water, there is less vegetation growing in the region in general and the wildlife species found in the project area and the surrounding are those that can tolerate dry and hot climate. The main trees and bushes found in these areas in general are acacia, cactus, Babul, etc. Wildlife species such as mules, gazelles, camels, snakes, and lizards are likely to be found in the project area and the surrounding.

The subject area falls within the Namib Desert Biome (Mendelsohn, Jarvis, Roberts, & Robertson, 2002). All endemic plant species found within the area are considered to be drought tolerant, drought resistant or succulent. Short lived annuals, which occur after local rainfalls and floods, provide a vital source of food for game grazing within the Namib plains. It is estimated that at least 56 reptile, 5 amphibian, 31 mammal and 124 bird species (breeding residents) are known to or expected to occur in the general/immediate coastal (i.e. EPL 8741) areas of which a large proportion are endemics. Endemics include at least 55% of the reptiles, 40% of the amphibians, 19% of the mammals and 50% (7 of the 14 Namibian endemics) of all the breeding and/or resident birds known and/or expected to occur in the general area.

The very high percentage of unique and/or endemic species (55%) underscores the importance of the general area for reptiles. Most species – e.g. *Afroedura africana africana* and *Pedioplanis husabensis* – are understudied and their importance to the general ecology not well understood. Amphibians are not well represented in the dry western parts of Namibia and their presence in the Khan River and associated tributaries, which potentially could serve as habitat in the general area, is currently unknown.

Mammals, especially small mammals (rodents and bats) are viewed as the most contentious in the proposed development areas due to the limited knowledge of their actual habitat preferences and uses as well as their actual utilisation of the greater area. The two bats – Namibian Wing-gland Bat and Namib Long-eared Bat – as well as the subspecies of the Littledale's Whistling Rat known and/or expected from the general area are viewed as the most important species, but their actual presence in the proposed development area is currently unknown.

Endemic birds are well represented in the general area (50% of all Namibian endemics) which also includes a high proportion of southern African endemics (6.5%) and near-endemics (27%). The most problematic species are those associated with gravel plains such as the Rüppell's Korhaan and Gray's Lark as well as the Herero Chat which are known to breed in the general area although to what extent they occur in the proposed development area is currently unknown.

## 5.7 Archaeology and Heritage Sites

There are no declared heritage sites by the National Heritage Council of Namibia on EPL 8741. Accidental find procedure at the subject site may be required. A separate heritage impact assessment will be annexed to this report

## 6. Assessment of Impacts

### Overview

Environmental aspects and potential impacts were qualitatively assessed and identified by the Environmental Practitioner during the screening and assessment phases, in consultation with authorities, IAPs and the environmental team. This section provides a summary of activities associated with the proposed project in various phases as well as associated environmental aspects and potential impacts.

### Project Phases addressed

- **Exploration phase:** this is the phase where the proponent will be carrying out exploration of mineral and other minerals. It is also the time when proponent has to undertake maintenance and care of the environment and machinery.
- **Environmental monitoring phase:** this is the phase when mitigation measures are implemented, and the monitoring plan put in place. This phase runs concurrently with the exploration and decommissioning.
- **Decommissioning phase:** This is the phase when exploration activities cease as a result of either poor exploration results or loss of market demand for the targeted commodity. Rehabilitation measures will have to put in place during exploration and before decommissioning.

## **Identified potential impacts**

### **Positive impacts**

- Employment creation
- Revenue generation through royalties and taxes
- Local development

### **Negative impacts**

- Air quality/dust
- Noise
- Occupational health and safety
- Impact on terrestrial biodiversity
- Impact on ground and surface water
- Archaeological impact
- Visual impact
- Safety and Security

## **6.1 Impact analysis and evaluation**

In this section, the impacts of the exploration activities on the human and biophysical environment were evaluated and analyzed. The identified impacts were assessed in terms of probability (likelihood of occurring), extent (spatial scale), magnitude (severity) and duration (temporal scale). The impact assessment methodology used to determine the significance of impacts prior and after mitigation. This methodology ensures uniformity and that potential impacts can be addressed in a standard manner. The following assessment methodology was used to examine each impact identified:

Table 4: Impact assessment criteria

<b>PART A: DEFINITION AND CRITERIA</b>		
<b>Definition of SIGNIFICANCE</b>	<b>Significance = consequence x probability</b>	
<b>Definition of CONSEQUENCE</b>	<b>Consequence is a function of severity, spatial extent and duration</b>	
<b>Criteria for ranking of the SEVERITY of environmental impacts</b>	<b>H</b>	Substantial deterioration (death, illness or injury). Recommended level will often be violated. Vigorous community action. Irreplaceable loss of resources.
	<b>M</b>	Moderate/ measurable deterioration (discomfort). Recommended level will occasionally be violated. Widespread complaints. Noticeable loss of resources.
	<b>L</b>	Minor deterioration (nuisance or minor deterioration). Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints. Limited loss of resources.
	<b>L+</b>	Minor improvement. Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints.
	<b>M+</b>	Moderate improvement. Will be within or better than the recommended level. No observed reaction.
	<b>H+</b>	Substantial improvement. Will be within or better than the recommended level. Favorable publicity.
<b>Criteria for ranking the DURATION of impacts</b>	<b>L</b>	Quickly reversible. Less than the project life. Short term
	<b>M</b>	Reversible over time. Life of the project. Medium term
	<b>H</b>	Permanent. Beyond closure. Long term.
<b>Criteria for ranking the SPATIAL SCALE of impacts</b>	<b>L</b>	Localized - Within the site boundary.
	<b>M</b>	Fairly widespread – Beyond the site boundary. Local
	<b>H</b>	Widespread – Far beyond site boundary. Regional/ national

<b>PART B: DETERMINING CONSEQUENCE</b>					
<b>SEVERITY = L</b>					
<b>DURATION</b>	Long term	<b>H</b>	<b>Medium</b>	<b>Medium</b>	<b>Medium</b>

	Medium term	<b>M</b>	<b>Low</b>	<b>Low</b>	<b>Medium</b>
	Short term	<b>L</b>	<b>Low</b>	<b>Low</b>	<b>Medium</b>

<b>SEVERITY = M</b>					
<b>DURATION</b>	Long term	<b>H</b>	<b>Medium</b>	<b>High</b>	<b>High</b>
	Medium term	<b>M</b>	<b>Medium</b>	<b>Medium</b>	<b>High</b>
	Short term	<b>L</b>	<b>Low</b>	<b>Medium</b>	<b>Medium</b>

<b>SEVERITY = H</b>					
<b>DURATION</b>	Long term	<b>H</b>	<b>High</b>	<b>High</b>	<b>High</b>
	Medium term	<b>M</b>	<b>Medium</b>	<b>Medium</b>	<b>High</b>
	Short term	<b>L</b>	<b>Medium</b>	<b>Medium</b>	<b>High</b>
			<b>L</b>	<b>M</b>	<b>H</b>
			Localized Within site boundary Site	Fairly widespread Beyond site boundary Local	Widespread Far beyond site boundary Regional/ national
<b>SPATIAL SCALE</b>					

<b>PART C: DETERMINING SIGNIFICANCE</b>				
Definite/ Continuous	<b>H</b>	<b>Medium</b>	<b>Medium</b>	<b>High</b>
Possible/ frequent	<b>M</b>	<b>Medium</b>	<b>High</b>	<b>High</b>
Unlikely/ seldom	<b>L</b>	<b>Low</b>	<b>Low</b>	<b>Medium</b>
		<b>L</b>	<b>M</b>	<b>H</b>
<b>CONSEQUENCE</b>				

<b>PART C: DETERMINING SIGNIFICANCE</b>					
<b>PROBABILITY (of exposure to impacts)</b>	Definite/ Continuous	<b>H</b>	<b>Medium</b>	<b>Medium</b>	<b>High</b>
	Possible/ frequent	<b>M</b>	<b>Medium</b>	<b>Medium</b>	<b>High</b>
	Unlikely/ seldom	<b>L</b>	<b>Low</b>	<b>Low</b>	<b>Medium</b>
			<b>L</b>	<b>M</b>	<b>H</b>
<b>CONSEQUENCE</b>					

<b>PART D: INTERPRETATION OF SIGNIFICANCE</b>	
<b>Significance</b>	<b>Decision guideline</b>
High	It would influence the decision regardless of any possible mitigation.
Medium	It should have an influence on the decision unless it is mitigated.
Low	It will not have an influence on the decision.

**H+ = High positive; H= High; L+ = Low positive; L = Low; M = Medium**

### **Mitigation measures**

Where negative impacts are identified, mitigation objectives have been set, and practical, attainable mitigation measures must be recommended that will minimize or eliminate the impacts. Where mitigation is not feasible, this has been stated and reasons given. In the case of positive impacts, enhancement measures are recommended for optimizing the benefit to be derived.

### **Monitoring**

Monitoring requirements with quantifiable standards to assess the effectiveness of mitigation actions have been recommended where appropriate. These must indicate what actions are required, by whom, and the timing and frequency thereof. If further investigations must be undertaken and monitoring programmes implemented before, during and after operations.

## **6.2 Identified impacts on bio-physical environment**

### **Negative Impacts**

The following potential effects on the environment during the construction, operation and decommissioning phase of the quarrying project have been identified:

#### **6.2.1 Air quality: Dust emissions**

The proposed exploration activities are the potential of fugitive sources for the dust particles as they are easily dispersed and carried away by the winds. During the operation phase dust will be generated onsite by earth moving equipment and also on the gravel road by trucks and vehicles. Continuous movements of people, vehicles and earth moving vehicles on site can thus loosen and



re-suspend the deposited material again into the air. Windblown particulates from natural exposed surfaces common especially in semi-arid and arid areas can result in significant dust emissions with high particulate concentrations near the source locations. As mentioned above, emission of dust into the environment can be effectively contained by means of damping. Dust may be might be aggravated during the winter months when strong winds occur (>10 m/s). Fall out dust settling on vegetation is likely to cause local disruptions in herbivorous and predatory complexes and should be minimized as far as possible. Where possible the project should avoid, minimize, and control adverse impacts to human health, safety, and the environment from emissions to air. Dust generated and air pollutants suspended in the air could be inhaled by the workers leading to respiratory diseases.

Moreover, vehicle exhausts contain a number of pollutants including carbon dioxide (CO<sub>2</sub>), carbon monoxide (CO), hydrocarbons, oxides of nitrogen (NO<sub>x</sub>), Sulphur and PM10. Tiny amounts of poisonous trace elements such as lead, cadmium and nickel are also present. The quantity of each pollutant emitted depends upon the type and quantity of fuel used, engine size, speed of the vehicle and abatement equipment fitted. Once emitted, the pollutants are diluted and dispersed in the ambient air. Pollution by hydrocarbon combustion in vehicles is of less concern as field vehicles are fitted with suitable exhaust filters.

Table 5. Qualitative assessment of air quality impacts for the movement of vehicles on un-paved roads and drilling activities.

Mitigation	Severity	Duration	Spatial Scale	Consequence	Probability of Occurrence	Significance
Unmitigated	<b>M</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>M</b>	<b>H</b>
Mitigated	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>

**Mitigation Measures** to be enforced

- Dust suppressants shall be applied to all the exploration activities as well as all off roads and gravel roads.
- The speed of exploration vehicles must be strictly controlled to reduce dust or prevent deterioration of the roads being used.
- All off roads in the project area should have a speed limit of 50km/h in order to minimize the amount of dust generated by vehicles.

- During high wind conditions the proponent must make the decision to cease works until the wind has calmed down.
- Use of personal protective equipment for proper dust control for respiratory protection and other necessary PPE (gloves, work suits, sun hats etc.).
- Converting high-use vehicles to cleaner fuels, where feasible
- Installing and maintaining emissions control devices, such as catalytic converters.
- Implementing a regular vehicle maintenance and repair program.
- The movement of drilling related vehicles on unpaved access track will be on a small scale.
- Water sprays should be used around the lay-down area when drilling, especially when performing reverse circulation, where water is not used.
- Regardless of the size or type of vehicle, fleet owners /operators should implement the manufacturer recommended engine maintenance programs.

### **Monitoring**

- Daily inspection by the ENC of the gravel roads and exploration site on possible dust creation that requires attention.
- Daily inspection on site by the ENC to ensure that all workers are wearing their protective clothes at all time during the exploration process and the dry skin contact with gloves is prevented.

### **6.2.2 Noise pollution from vehicles, drilling and other activities**

Noise sources in the proposed project are of various types, identified sources are: point sources, line source, area source, and moving sources. Potential noise during exploration activities may originate from vehicles, machinery, hammers, excavators, and drill rigs. Drilling rigs may remain on site for periods ranging from days, weeks or months. Noise levels can be up 80dB for diamond drilling and 120dB for reverse circulation at rig source on a <100m<sup>2</sup> footprint, hence the employees are the immediate receptor of the noise impacts.

Noise pollution can be defined as any disturbing or unwanted noise that interferes or harms human or wildlife. Continuous exposure to noise leads to multiple adverse effects on physical and mental state of the mining community as a whole. Some of these effects are: tinnitus, and noise induced hearing loss (NIHL), reduced performance, sleeping difficulties, disturbance in conversation, annoyance or stress, anxiety, depression and high blood pressure. According to ISO 18001 standards, workers are not allowed to work under noise levels that are equal to or exceed 85 decibels per 8 hours. Noise pollution has negative impact on wildlife species by reducing habitat quality, increase stress level land masking other sounds.

A noise baseline survey will be undertaken prior to the commencement of the mining project to assess noise level impacts at designated points of the project site. The study will focus on the area noise monitoring to assess noise level of the study as well as a personal noise dosimetry to measure the percentage of noise dose to which a person is exposed during movements in different noisy or quieter areas during a working shift within the mine.

Table 6. Shows qualitative assessment of noise impact.

Mitigation	Severity	Duration	Spatial Scale	Consequence	Probability of Occurrence	Significance
Unmitigated	<b>M</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>M</b>	<b>M</b>
Mitigated	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>

**Mitigation Measures** to be enforced:

- Drilling will only be conducted during the day, where the drill-site is located close to a dwelling.
- Workers working near high noise exploration machinery will be provided with ear protection equipment such as ear muffs and earplugs.
- Reduction of noise from drilling rigs by using down hole drilling
- No noise generating activities should be undertaken before 8am and after 17:00 hours, over weekends and on public holidays.
- Employees should be limited to working hours only at most 8 hours per day.
- In the event that activities continue outside the stipulated hours the contractor will

communicate such occurrences to potentially affected communities prior to commencing such activities.

- Do not allow the use of horns/hooters as a general communication tool, but use it only where necessary as a safety measure.
- Safe minimum distance from noise generating activities should be introduced.
- Noise levels should not be equal to or exceed 85dBA for workers working an 8-hour shift (according to ISO 18000).

### **Monitoring**

Noise monitoring may be carried out for the purposes of establishing the existing ambient noise levels in the area of the proposed project, or for verifying operational phase noise levels. Noise monitoring programs should be designed and conducted by trained specialists. The type of acoustic indices recorded depends on the type of noise being monitored, as established by a noise expert. Continuous monitoring of noise levels should be conducted to make sure the noise levels at the site does not exceed acceptable limits.

### **6.2.3 Impacts on terrestrial biodiversity**

The transformation of land for any purpose results in the destruction of the site-specific biodiversity, the fragmentation of habitats, reduces its intrinsic functionality and reduces the linkage role that undeveloped land fulfils between different areas of biodiversity importance. The alteration will occur through physical disturbance and continued human presence and use. Biodiversity assessment relates to the impact that personnel have on the surrounding fauna and vegetation. Some of the activities of the proposed project such as vehicle movement, human movements, excavating pose a risk to the integrity of baseline biodiversity as well as the biological productivity of the site and the immediate proximity. The following mitigations are to be undertaken to minimize further impact on the existing biodiversity:

## **Fauna**

The proponent shall ensure that no animal shall be captured, killed or harmed by any of the employees in any way. Wildlife poaching will strongly be avoided as this is an offence and anyone caught infringing in this regard will face suspension from the project and will be liable for prosecution.

## **Avifauna**

If care is not taken, possible disturbance of birds or nest on sites by employees is expected. Should the employees observe any bird nesting sites for endangered avifauna such as vultures, they should notify Ministry of Environment, Forestry and Tourism.

## **Flora/ Vegetation**

Pollutants such as dust, gaseous emissions and air- borne particulates will be produced and get deposited on the plants. Most of the effects of dust particles on plants include the potential to block and damage the stomata such that photosynthesis and respiration are affected. This will no doubt affect the physiological activities of the plants most especially those around the project site such as in photosynthesis and respiration. The implication of these is that some of the plants may have retarded growth while others may be eliminated

The natural vegetation is seemingly undisturbed in the project area except for grasses, which have been grazed by livestock and wild animals. Some vegetation species in the area may be adversely impacted by the project. The type of vegetation that might be affected by the project are:

- Bushes
- Ephemeral grasses
- Small trees

Some of the sensitive vegetation types in the area include:

- Shallow drainage line vegetation
- Scrublands surrounding the project area

Certain species regarded as particularly important for conservation may yet be identified and made known via an Addendum to this report. If particularly important species are found, they will be located by GPS and their locations communicated to the Ministry of Environment, Forestry and Tourism. Such locations will then be demarcated and completely avoided

**Mitigation Measures to be enforced: flora**

- The footprint of the area to be disturbed will be minimized as far as is practically possible.
- Remove unique fauna and sensitive fauna before commencing with the development activities and relocate to a less sensitive/disturbed site if possible.
- Disturbed areas must be kept to a minimum. Off-road driving should not be allowed and only existing tracks should be used.
- Remove unique fauna and sensitive fauna before commencing with the development activities and relocate to a less sensitive/disturbed site if possible.
- Recommend the planting of local indigenous species of flora as part of the landscaping as these species would require less maintenance than exotic species and have important ecological functions in terms of carbon sequestration from decomposing materials at the site.
- Disturbance of marginal vegetation in the mountains should be limited.
- Where it is clear that certain large species will be destroyed consideration should be given to offering to rescue the individuals involved and relocate them to nearby gardens.
- Transplant removed trees where possible, or plant new trees in lieu of those that have been removed.
- The protected and endemic species should be re-introduced in the area.

**Mitigation Measures to be enforced: fauna**

- Honour agreements set out in the site-access contracts, specifically relating to the areas utilized for professional hunting. Special consideration should be given to the sensitive hunting season.

- Barriers/barricades confining driving trucks must be erected to avoid stray driving and trampling on habitat. Proper demarcation of the exploration area.
- Avoid disturbance on invertebrate on-site and along the gravel road stretch.
- Avoid the creation of multiples roads strips, which could result in the disturbance of breeding sites for various mammals.
- A fauna survey will be conducted to determine the effect of fragmented habitat on game species should the need arise.
- Care will be taken to ensure that no litter is lying around as these may end up being ingested by wild animals
- No workers will be allowed to collect or snare, hunt or otherwise capture any wild animal.
- No domestic animals will be permitted on the exploration site by means of erecting a perimeter fence; small stock should graze at designated areas.
- Birds or Nest sites will not be disturbed by any employee, visitor or contractor.
- If possible encountered bird kills and nest removal should be registered in a biodiversity data-base and information should be made available to the general public.
- There should be limited movement of heavy-duty machinery and exploration equipment in the area to avoid interference.

**Methods for monitoring:**

- Regular monitoring of any unusual signs of animal habitat.

Table 7. Shows the qualitative impact assessment for biodiversity related to the exploration activities and the impact of personnel on biodiversity.

Mitigation	Severity	Duration	Spatial Scale	Consequence	Probability of Occurrence	Significance
Unmitigated	<b>M</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>M</b>	<b>M</b>
Mitigated	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>

## Alien invasive plants

Alien invasive plants are prevalent in areas affected by land transformation and anthropogenic disturbance. It is a well-known fact that disturbance to the natural environment often encourages the establishment of alien invasive weed species. It is also possible that, plant or seed material may adhere to car tyres or animals. In some cases seeds of alien invasive plants may blow from debris removed at sites.

Some of the plant species that could become invasive in the area are listed below:

- *Prosopisglandulosa*
- *Lantana camara*
- *Cyperusesculentus*
- *Opuntia imbricate*
- *Cereus jamacara*
- *Melia azedarach*
- *Harissia martini*

There are numerous ways in which invasive species can be introduced diuilieliberately or unintentionally.

Table 8. Shows the qualitative impact assessment of alien invasive plants.

Mitigation	Severity	Duration	Spatial Scale	Consequence	Probability of Occurrence	Significance
Unmitigated	L	L	L	L	L	L
Mitigated	L	L	L	L	L	L

## Mitigation Measures to be enforced:

- The site manager will ensure that debris is properly disposed.
- Vehicle tyres inspections can be carried out although this may not be a practical mitigation measure.
- The proponent should implement an alien plants awareness campaign to educate and sensitize the employees and the local community on the menace of planting alien vegetation in the area.
- Eradicating alien plants by using an Area Management Plan.
- Prevent the introduction of potentially invasive alien ornamental plant species.



- The proponent should adopt and support the implementation of an annual alien plants clearing campaign.

**Methods for monitoring:**

- Regular monitoring of any unusual signs of alien species.
- The proponent and local community should establish an alien plant task force to ensure that there is no planting of alien plants species in the area.

**6.2.4 Land-use and land contamination**

The assessment for land use refers specifically to the impact the exploration activities have on farming and professional hunting activities. Land contamination is considered contaminated when it contains hazardous materials or oil concentrations above background or naturally occurring levels. When contamination of land is suspected or confirmed during any project phase, the cause of the uncontrolled release should be identified and corrected to avoid further releases and associated adverse impacts. Contaminated lands should be managed to avoid the risk to human health and ecological receptors. The preferred strategy for land decontamination is to reduce the level of contamination at the site while preventing the human exposure to contamination.

Table 9. Shows the qualitative impact assessment for land use and land contamination related to the exploration activities.

Mitigation	Severity	Duration	Spatial Scale	Consequence	Probability of Occurrence	Significance
Unmitigated	<b>M</b>	<b>H-M</b>	<b>L</b>	<b>M</b>	<b>M</b>	<b>M</b>
Mitigated	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>

**Actions/Mitigation measures:**

- The footprint of the area to be disturbed will be minimized as far as is practically possible.
- Areas used as lay down areas are to be raked and/or ploughed to encourage re-vegetation
- Agree on relevant compensation with landowners where land used for hunting purposes are impacted.

### **6.2.5 Groundwater and surface water contamination**

The main groundwater and surface water contaminants expected from the proposed exploration activities include chemicals such as heavy metals, organic solvents, mineral oils, and microbiological contaminants such as faecal bacteria and viruses. Due to the crystalline and metamorphic nature of the targeted lithology on project area, these pollutants are unlikely to pose any negative impacts on the underground water system. Sources of pollution can be categorized into two major types: point source pollution and non-point source pollution. Point source pollution (e.g. leaking mobile toilets and fuel, oil, chemical spillage) is a single identify localized source while non-point source pollution (diffuse sources such as petrochemical pollution) is characterized by multiple discharge point.

Another source of water contamination is storm water. Storm water includes any surface runoff and flows resulting from precipitation, drainage or other sources. Typically storm water runoff contains suspended sediments, metals, petroleum hydrocarbons, Polycyclic Aromatic Hydrocarbons (PAHs), coliform, etc. Rapid runoff, even of uncontaminated storm water, also degrades the quality of the receiving water by eroding stream beds and banks. Groundwater is an important resource and must be protected. The proponent has set out various measures to ensure the protection of groundwater quality

#### **Mitigation Measures** to be enforced:

- Non-toxic and biodegradable drilling lubricant will be used
- No dumping of waste products of any kind in or in close proximity to surface water bodies and possible recharge areas for groundwater.
- Wastewater should not be discharged directly into the environment
- Waste water / contaminated water should be contained for proper disposal.
- Drip trays must be placed underneath vehicles when not in use to contain all oil that might be leaking from these vehicles.

- In all areas where there is storage of hazardous substances (i.e. hydrocarbons), there will be containment of spillages on impermeable floors and bund walls that can contain 110% of the volume of the hazardous substances.
- All refueling and any maintenance of vehicles will take place on impermeable surfaces.
- Spill kits will be readily available on site. Employees and/or contractors will be trained to use the spill kits to enable containment and remediation of pollution incidents.
- Environmental awareness for contractor and employees to be included during inductions
- Avail a spill response action plan in case of accident and any spills will be contained and cleaned up immediately.
- Accessibility to spill prevention and response equipment, such equipment should be visible and accessible to all employees at any given time.
- Spills will be cleaned up immediately to the satisfaction of the Environmental Manager by removing the spillage together with the polluted soil and by disposing of them at a recognized facility as stipulated in the spill response action plan.
- Designated waste collection tanks should be available on-site and away from waterways, and such isolation should be maintained at all times.
- Storage of the hazardous substances in a bounded area,

Table 10. Shows the qualitative impact assessment of surface and groundwater:

Mitigation	Severity	Duration	Spatial Scale	Consequence	Probability of Occurrence	Significance
Unmitigated	<b>M</b>	<b>L</b>	<b>M</b>	<b>L</b>	<b>L</b>	<b>H</b>
Mitigated	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>

### **6.2.6 Fire and explosion hazard**

Hydrocarbons are volatile under certain conditions and their vapors in specific concentrations are flammable. If precautions are not taken to prevent their ignition, fire and subsequent safety risks may arise. All fuel storage and handling facilities as well as fire precautions and fire control measures at the site must comply with strict safety distances as prescribed by SANS 10089. SANS 10089 is adopted by the Ministry of Mines and Energy as the national standard. A holistic fire protection and prevention plan is needed. It must further be assured that sufficient water is available for firefighting purposes. It is important to recognize that a responsive fire prevention plan does not solely include the availability of firefighting equipment, but more importantly, it involves premeditated measures and activities to timeously prevent, curb and avoid conditions that may result in fires. Therefore, an integrated fire prevention plan should be drafted before drilling. In cases where a fire or an explosion takes place on site, the following mitigation measures should be taken to ensure safety of the people and reduce damage to properties.

#### **Mitigation Measures to be enforced**

- Sufficient fire extinguishers will be installed on every exploration vehicle.
- A designated area needs to be identified as an assembly area where personnel meet in case of such incident. All employees, contractors and visitors should be made aware of this area through inductions conducted before entering the site.
- Exploration personnel will be trained on how to use fire extinguishers. A fire and explosive management policy and procedures document for the site should be drafted and review on a regular basis and every employee should know the content of this document so that they can act accordingly when a fire or an explosion breaks out.
- Refresher courses on the content of the fire and management policy and procedure document should be given on a regular basis to ensure that the employees aware and are competent in reacting to such incidents.
- Sufficient fire extinguishers with sufficient length of hosepipes will be made available on site for fire protection.

Table 11. Shows the qualitative impact assessment of fire and explosion hazards:

Mitigation	Severity	Duration	Spatial Scale	Consequence	Probability of Occurrence	Significance
Unmitigated	L	L	L	L	L	L
Mitigated	L	L	L	L	L	L

### 6.2.7 Hazardous waste and materials management

Hazardous material can be classified according to the hazard as: explosives, compressed gases, including toxic or flammable gases; flammable liquids; flammable solids; oxidizing substances; toxic materials and corrosive substances. These 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 thereby in certain circumstances.

When a hazardous material is no longer usable for its original purpose and is intended for disposal, but still has hazardous properties, it is considered a hazardous waste. In the proposed project, hazardous waste will be collected and sent for treatment before disposal. The total volume of these hazardous materials and chemicals on site is never likely to be substantial and thus the overall risks during all project phases are not likely to be high. The overall objective of hazardous materials management is to avoid or, when avoidance is not feasible, minimize uncontrolled releases of hazardous materials or accidents (including explosion and fire) during their production, handling, storage and use, this objective can be achieved by:

- ✓ Establishing hazardous materials management priorities based on hazard analysis of risky operations identified through Social and Environmental Assessment;
- ✓ Where practicable, avoiding or minimizing the use of hazardous materials
- ✓ Preventing uncontrolled releases of hazardous materials to the environment or uncontrolled reactions that might result in fire or explosion;

- ✓ Using engineering controls (containment, automatic alarms, and shut-off systems) commensurate with the nature of hazard;
- ✓ Implementing management controls (procedures, inspections, communications, training, and drills) to address residual risks that have not been prevented or controlled through engineering measures.

Table 12. Shows the qualitative impacts assessment of hazardous waste and materials:

Mitigation	Severity	Duration	Spatial Scale	Consequence	Probability of Occurrence	Significance
Unmitigated	M	L	L	M	L	L
Mitigated	L	L	L	L	L	L

**Mitigation Measures** to be enforced

- All chemicals and other hazardous substances must be stored and maintained in accordance with the Hazardous Substances Ordinance (No. 14 of 1974), with all relevant licences and permits to be obtained where applicable.
- Given the potential harm to human health during handling and use of any of hazardous substances it is essential that all staff be trained with regards to the proper handling of these substances as well as First Aid in the case of spillage or intoxication.
- Storage areas for all substances should be bunded and capable to hold 120% of the total volume of a given substance stored on site.
- Job safety analysis to identify specific potential occupational hazards and industrial hygiene surveys, as appropriate, to monitor and verify chemical exposure levels, and compare with applicable occupational exposure standards.
- Hazard communication and training programs to prepare workers to recognize and respond to workplace chemical hazards. Programs should include aspects of hazard identification, safe operating and materials handling procedures, safe work practices, basic emergency procedures, and special hazards unique to their jobs Training should incorporate information from Material Safety Data Sheets for hazardous materials being handled. MSDSs should be readily accessible to employees in their local language.

- Provision of suitable personal protection equipment (PPE) (footwear, masks, protective clothing and goggles in appropriate areas), emergency eyewash and shower stations, ventilation systems, and sanitary facilities.
- Monitoring and record-keeping activities, including audit procedures designed to verify and record the effectiveness of prevention and control of exposure to occupational hazards, and maintaining accident and incident investigation reports on file for a period of at least five years.

### **6.2.8 Solid waste management**

Waste can be generated from contractors, staff members and other visitors to the area. Proper solid waste management will involve full commitment by all the employees and contractors of the site. Solid waste which will be generated from this project if not managed will have an effect on the environment. Given the remote location and the land-use, the dumping of domestic waste within the exploration area could prove hazardous to wildlife and livestock, as well as impede agricultural production; the assessment will focus on these impacts. The types of waste that could be generated during operation include hazardous waste, general industrial waste and domestic waste. Domestic waste will be temporarily handled and stored onsite before being removed for final disposal at permitted waste disposal facilities. A registered Waste Management Company would be contracted to remove all hazardous waste from the site. Furthermore, ablution facilities will use chemical toilets and/or sealed septic tanks and the sewerage taken to the Karibib periodically.

**Mitigation Measures** to be enforced:

- Waste generated will be handled in accordance with the contract signed with the landowner. This shall include: waste should be separated and recycled / re-used where possible. Where waste management procedures do not exist, a procedure should be developed.
- Suitable receptacles for waste disposal will be provided at appropriate locations on site. These receptacles will be clearly marked for different waste types.

- Mandatory waste segregated right at the source of waste generation. The collection of segregated waste would be made from the site and amenity areas.
- Employees and contractors will be shown the importance of correct waste disposal as well as waste minimization and recycling.
- Place priority on waste reduction, waste reuse and waste recycling, in that order.
- Sufficient waste storage bins on site and regular emptying of the waste storage bins.
- Strictly, no burning of waste on the site or at the disposal site, as it possesses environmental and public health impacts.
- The collected solid waste should be disposed at registered and approved disposal site agreed upon by both Municipality and the proponent.

Table 13. Shows qualitative impacts assessment for waste management.

Mitigation	Severity	Duration	Spatial Scale	Consequence	Probability of Occurrence	Significance
Unmitigated	<b>L</b>	<b>H</b>	<b>L</b>	<b>M</b>	<b>M</b>	<b>L</b>
Mitigated	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>	<b>L</b>

### 6.2.9 Heritage and archaeological impacts

Potential damage to archaeological sites may be impacted through unintentional destruction or damages are a result of vehicle tracks, footprints and actions of contractors, employees. Currently, there is no information provided about known archaeological heritage remains and sites within the project site. Therefore, this impact can be rated medium to low, if there are no mitigation measures in place. All archaeological remains are protected under the National Heritage Act (2004) and will not be destroyed, disturbed, or removed. The Act also requires that any new discoveries archaeological significant objects on the site should not be disturbed but are to be reported to the project Environmental officer or National Heritage Council offices.

Table 14: Shows heritage impact assessment.

Mitigation	Severity	Duration	Spatial Scale	Consequence	Probability of Occurrence	Significance
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Unmitigated	L	M	L	M	L	M
Mitigated	L	L	L	L	L	L

**Mitigation Measures** to be enforced

- Adhere to practical guidelines provided by an archeologist on site to reduce archaeological impacts.
- The site location where archaeological features might be found should be d marked with flag tape and the GPS coordinates should be recorded.
- Notices/ information boards information will be placed on site.
- Training employees regarding the protection of these sites.
- Obtain appropriate clearance or approval from the competent authority.
- In the event of such finds, all activities must stop and the project management or contractors should notify the National Heritage Council of Namibia immediately.

**Monitoring**

- An archaeologist will inspect any identified archaeological sites before project commencement.

**6.2.10 Visual impacts**

Exploration activities leave scars on the landscape and change the aesthetic appeal of the overall area resulting in negative visual impacts. Landscape alteration by off-road driving is a major concern, particularly with regard to uncontrolled use of 4x4 vehicles and quad-bikes. Another process linked to landscape alteration is the excavations of trenches. These scars can contrast the surrounding landscape, and this can potentially cause a visual nuisance to tourists if the area is near any tourists routes.

**Mitigation Measures** to be enforced

- The access road to exploration sites must be established in consultation with the landowner and usage of existing roads shall be enforced.

- The design, construction, and location of access to main roads will be in accordance with the requirements laid down by the controlling authority.
- Negative visual effects can further be prevented through mitigations (i.e. keep existing trees, introduce tall indigenous trees).
- When exploration activities cease, restore the visual sense of the area to its natural state for instance all excavations, pits are to be backfilled and drillings holes to be capped when no longer in use
- Care must be taken to ensure that all rehabilitated areas are similar to the immediate environment in terms of visual character, vegetation cover and topography and any negative visual impacts will be rectified to the satisfaction of the environmental consultant.
- Minimize disturbance to topsoil.
- Overburden will be placed back into excavation as part of the rehabilitation programme.
- Restrict off road vehicles and equipment to designated areas.
- Maintain the small shrubs found on the site and only remove vegetation that has an impact on the development.
- Land markings, vehicle tracks, and excavations shall be restored to the original landform and, visual state as much as possible.
- In the case of dual or multiple uses of access roads by other users, arrangements for multiple responsibilities must be made with the other users. If not, the maintenance of access roads will be the responsibility of the holder of the exclusive prospecting licence (EPL).

Table 15. Shows visual impacts impact evaluation.

Mitigation	Severity	Duration	Spatial Scale	Consequence	Probability of Occurrence	Significance
Unmitigated	L	M	L	M	L	M
Mitigated	L	L	L	L	L	L

### 6.2.11 Health, safety and security

Exploration activities are associated with serious health and safety risks to workers on site. There are number of hazards associated with the movement of equipments and impact on dangerous parts of the equipment. The risk of an accident will be high if the dangerous parts are exposed and operators are poorly trained or supervised. This increases the possibility of injuries, and the responsible manager must ensure that all staff members are briefed about the potential risks of injuries on site. Occupational exposures are normally related to the dermal contact with fuels and inhalation of fuel vapors during handling of such products. The manager is further advised to ensure that adequate emergency facilities, including first aid kits, are available on site. All Health and Safety standards specified in the Labour Act should be complied with.

#### **Mitigation Measures** to be enforced:

- All vehicular equipment operators must have valid licences for that particular vehicle class.
- Ensure that all exploration personnel are properly trained depending on the nature of their work.
- Provide for a first aid kit and a properly trained person to apply first aid when necessary.
- A wellness program should be initiated to raise awareness on health issues, especially the impact of sexually transmitted diseases as described above.
- Emergency medical treatment should be available on site. Provide for a first aid kit and a properly trained person to apply first aid when necessary.
- A wellness program should be initiated to raise awareness on health issues, especially the impact of sexually transmitted diseases, Covid 19, hepatitis etc. Encourage HIV counseling and testing and facilitate access to Antiretroviral (ARV) medication.
- Prevent diseases spread by biological agents by providing proper toilets and cleaning up facilities, proper waste removal, running water and detergent on site.
- Clearly demarcate the exploration (area of current activities e.g. drilling site) site boundaries along with signage of “no unauthorized access”.
- Clearly demarcate dangerous areas and no-go areas on site.

- Staff and visitors to the exploration site must be fully aware of all health and safety measures and emergency procedures.
- The contractor must comply with all applicable occupational health and safety requirements.
- The workforce should be provided with all necessary Personal Protective Equipment where appropriate.
- The contractor must comply with all applicable occupational health and safety requirements.
- Implement the use of alcohol detectors.

**Methods for monitoring:**

- Public meetings will be held by the proponent whenever necessary.
- Regular meeting with the Interested and affected parties, where they can air their concerns should be done four times in a year.
- The outcome of these meeting should be recorded in a form of a report and the proponent needs to address the issues raised in this meeting.

Table 16: Impact evaluation for health, safety and security.

Mitigation	Severity	Duration	Spatial Scale	Consequence	Probability of Occurrence	Significance
Unmitigated	M	L	L	L	M	L
Mitigated	L	L	L	L	L	L

**6.3 Socio-economic impacts**

**6.3.1 Positive Impacts**

**1. Employment Creation**

Local recruitment will be encouraged during the lifespan of the project by the proponent with a target of at least 65% locals. The types of jobs will range from skilled, semi-skilled and unskilled. This operation will contribute to the alleviation of unemployment which is severe due to recent

retrenchments caused by Covid-19 economic recession. Employment on the new project will improve the livelihood of people and contribute to the local economy growth.

**Enhancement measures:**

- The proponent will introduce training programs (bursary schemes, on the job training etc) in order to boost the supply of local skills
- It is proposed that local people community members from Karibib, Arandis and surrounding areas should be considered first for employed. Especially where no specific skills are required.
- Gender equality considerations during recruitment process.
- Employment preference will be afforded to previously disadvantaged Namibians.

**2. Generation of revenue**

According to the law of Namibia, operating companies are to pay taxes. The proponent will pay tax to the government hence this will benefit the nation at large given that money generated from taxes is diverted to the public by the government.

**Enhancement measures:**

- Continuous payment of taxes due as regulated in the Namibian laws.

**6.3.2 Negative Impacts**

**Socio-economic concerns**

- As the movement of staff and contractors to and from the area increases, the risk of spread of HIV/AIDS and other STDs increases;
- Increased influx of jobseekers to the area as people come in search of job opportunities during the operational phase of the project. This could lead to potential increase in the unemployed people in the area and the establishment/growth in informal settlements which could exacerbate security issues due to increased crime rates.

- Impacts on the size and structure of the population. Increased informal settlement and associated problems;
- Negative impact on the health and safety of the surrounding community and workers
- Impact from loss of grazing for domestic livestock in “exclusive use zone”
- Impacts on cultural and spiritual values.
- Demographic factors: Attraction of additional population that cannot benefit from the project.
- Perception of Health and Safety risks associated with exploration.

**Mitigation Measures** to be enforced:

- The population change can be mitigated by employing people from the local community and encouraging the contractors to employ local individuals.
- Safeguard against the development of illegal settlements around the project area.
- The perception of risks will be mitigated by putting up safety signs wherever possible and ensuring that all employees and visitors to the site undergo a safety induction course.

**Methods for monitoring:**

- Public meetings will be held by the proponent whenever necessary.

Table 17. Shows the qualitative impacts assessment for socio economic.

Mitigation	Severity	Durati on	Spatial Scale	Consequence	Probability of Occurrence	Significance
Unmitigated	M	L	M	M	M	M
Mitigated	M	L	M	M	L	L

**Actions/Mitigation measures:**

- Honour agreements set out in the site-access contracts
- Consult and provide feedback regarding activities on the individual properties

- Provide contact details to a designated person, who will serve as liaison between landowners and the exploration teams
- Ensure gates are closed after entry and exit.
- Provide appropriate toilet facilities for the exploration workers on the site or agree with landowner to use certain facilities on the farm.

### **Municipal Service Impacts**

Proposed exploration project will require provision of the following services:

- ❖ Potable water for domestic purposes
- ❖ Temporary toilets
- ❖ Solid waste management
- ❖ Bulk water and power supply

## **7. Environmental Management Plan (EMP)**

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### **7.1 Purpose of Environmental Management Plan (EMP)**

Environmental management plan (EMP) serves as a tool that can ensure sustainable mineral exploration, as it contains measures aimed at protecting, rehabilitating and restoring the environment to its productive state before, during and after exploration. It serves as a risk strategy that contains logical framework, monitoring programs, mitigation measures and management control. The aim of an Environmental Management plan (EMP) is to develop procedures to implement project's mitigation measures and monitoring requirements. It is deemed as a risk strategy that contains logical framework and management control strategies to minimize potential environmental impacts to significant level. The EMP ensures the community that the environmental management of the project is acceptable. As well as stipulating the roles and responsibilities of persons involved in the project. An EMP ensures that legal and policy requirements are well known and understood by the proponent, its employees and contractors and will be strictly enforced by its management team. Issues and concerns identified in the EIA will form a set of environmental specifications that will be implemented on site.

The control measures described in this EMP have been developed following consideration of the findings of the Environmental Impact Study (EIS), which concluded that a number of environmental values would be impacted by the proposed exploration activities. The intent of the proposed control measures is to ensure that project related activities will not negatively affect the environment or the health, welfare and amenity of people and land uses by meeting or exceeding statutory requirements.

Furthermore, overall objectives of this EMP are:

- To develop measures that will mitigate the adverse impacts of the proposed project
- Ensuring compliance with regulatory authority stipulations and guidelines



- To formulate measures to enhance the value of environmental components where possible.
- To formulate measures to protect environmental resources as well enhance the value of environmental components where possible.
- Responding to unforeseen events and providing feedback for continual improvement in environmental performance.

### **Project Phases Covered in the EMP**

The following phases are addressed in this EMP:

- **Exploration phase:** this is the phase where the proponent will be carrying out exploration of mineral and other minerals. It is also the time when proponent has to undertake maintenance and care of the environment and machinery.
- **Environmental monitoring phase:** this is the phase when mitigation measures are implemented, and the monitoring plan put in place. This phase runs concurrently with the exploration and decommissioning.
- **Decommissioning phase:** This is the phase when exploration activities cease as a result of either poor exploration results or loss of market demand for the targeted commodity. Rehabilitation measures will have to put in place during exploration and before decommissioning.

#### **7.1.1 Legal Implications and obligations under the EMP**

The EMP will be sent to the Directorate of Environmental Affairs (DEA) of the Ministry of Environment, Forestry and Tourism (MEFT) for approval. Once the DEA is satisfied with the contents of the EMP, they will issue an Environmental Clearance Certificate (ECC) to the Proponent to commence with the exploration in the proposed area. The ECC is linked with the recommendations of the Environmental Management Plan. Once the ECC is issued, the EMP becomes a legally binding document and each role-player including contractors and sub-

contractors are made responsible to implement the relevant sections of the EMP and is required to abide by the conditions stipulated in this document

### **7.1.2 Environmental Management Principles**

The proponent will ensure that all parties involved in the project uphold the following broad aims:

1. All persons will be required to conduct all their activities in a manner that is environmentally and socially responsible. This includes all consultants, contractors, and sub-contractors, transport drivers, guests and anyone entering the exploration area in connection with the exploration project.

#### **2. Health, Safety and Social Well Being**

- ❖ Safeguard the health and safety of project personnel and the public against potential impacts of the project. This includes issues of road safety, precautions against natural dangers on site, and radiation hazards; and,
- ❖ Promote good relationships with the local authorities and their staff.

#### **3. Biophysical Environment**

- ❖ Wise use and conservation of environmental resources, giving due consideration to the use of resources by present and future generations;
- ❖ Prevent or minimize environmental impacts;
- ❖ Prevent air, water, and soil pollution, Biodiversity conservation and due respect for the purpose and sanctity of the area.

**To achieve these aims, the following principles need to be upheld.**

**Commitment and Accountability:**

The proponent's senior executives and line managers will be held responsible and accountable for: Health and safety of site personnel while on duty, including while travelling to and from site in company vehicles and environmental impacts caused by exploration activities or by personnel engaged in the exploration activities, including any recreational activities carried out by personnel in the area.

**Competence**

The proponent will ensure a competent work force through appropriate selection, training, and awareness in all safety, health and environmental matters.

**Risk Assessment, Prevention and Control**

Identify, assess and prioritize potential environmental risks. Prevent or minimize priority risks through careful planning and design, allocation of financial resources, management and workplace procedures. Intervene promptly in the event of adverse impacts arising.

**Performance and Evaluation**

Set appropriate objectives and performance indicators. Comply with all laws, regulations, policies and the environmental specifications. Implement regular monitoring and reporting of compliance with these requirements.

**Stakeholder Consultation**

Create and maintain opportunities for constructive consultations with employees, authorities, other interested or affected parties. Seek to achieve open exchange of information and mutual understanding in matters of common concern.

**Continual Improvement**

Through continual evaluation, feedbacks, and innovation, seek to improve performance regarding social health and well-being and environmental management throughout the lifespan of the exploration project.

### **Financial Provisions for exploration**

In line with Namibia’s environmental rehabilitation policy, the proponent will make the necessary financial provision for compliance with the EMP.

### **7.2 Organization plan: Roles and responsibilities**

The environmental aspects which may be affected by the proposed project have been categorized into negative and positive impacts as an extension of the preceding sections. This section summarizes the objectives, indicators to be observed, schedules to be adhered to and roles and responsibilities of various stakeholders to the EMP.

Table 18: Roles and responsibilities of various stakeholders to the EMP

<b>Role</b>	<b>Responsibilities and duties</b>
<b>Proponent</b>	<ul style="list-style-type: none"> <li>- Responsible for the management and implementation of the EMP</li> <li>- Ensure environmental policies are communicated to all personnel throughout the proposed project and that employees understand the guidelines of the EMP</li> <li>- Responsible for providing the resources required to complete the project tasks</li> <li>- Appoint a safety health and environment manager and supporting officers, and</li> <li>- Ensure all workers are inducted on safety measures.</li> </ul>
<b>Safety Health and Environment management</b>	<ul style="list-style-type: none"> <li>- Oversee safety health and environment related activities</li> <li>- Monitor daily operations and ensure adherence by personnel to the EMP</li> <li>- Maintain the community issues and concerns register and keep records of complaints, and</li> <li>- Maintain an up-to-date register of employees who have completed site induction.</li> <li>- Receive, recording and responding to complaints</li> <li>- Ensure adequate resources are available for the implementation of the EMP</li> <li>- Ensure safe and environmentally sound operations, and</li> <li>- Responsible for the management, maintenance, and revisions of this EMP</li> </ul>
<b>Foreman on duty</b>	<ul style="list-style-type: none"> <li>- Ensure that all contract workers, sub-contractors and visitors to the site are aware of the requirements of this EMP, relevant to their roles and always adhere to this EMP</li> </ul>

	<ul style="list-style-type: none"> <li>- Report any non-compliance or accidents to the Safety Health and Environment Manager.</li> </ul>
<b>Employees</b>	<ul style="list-style-type: none"> <li>- Adhere to measures set out in the EMP</li> <li>- Ensure they have undertaken a site induction, and</li> <li>- Report any operations or conditions which deviate from the EMP as well as any non-compliant issues or accidents to the environmental manager</li> </ul>

The table above is summarized below, with the following parties to aid in overseeing that the overall objective of this document is met;

- Management Committee
- Safety Health and Environment Manager
- Safety and Health Officer
- Environmental Officer
- Foreman on duty
- Personnel on duty/ employees

The following table emphasizes the role of each officer in the different management plans discussed in the previous section

Table 19: Roles and responsibilities of various stakeholders, environmental indicators and objectives.

<b>Objectives</b>	<b>Indicators</b>	<b>Responsibility</b>
To avoid any form of hydrocarbon spills on and around the exploration site	No hydrocarbon spillage or/and remnants of hydrocarbon spillage shall be visible round the project site	SF, PS, ENC
To avoid any form of liter be it paper, metal, plastic and human waste on and around the exploration site	No litter or/and remnants of liter shall be visible around the project site	SF, PS, ENC
To minimize land and soil disturbance	Driving tracks and excavation shall be restricted and only be visible within the project site.	SM, SF, ENC
To protect and conserve fauna and flora within the project area	Minimum levels of habitat disturbance	SM, SF, ENC
To minimize dust generation on site and atmospheric pollution	Emissions/generation particulate content of the dust around the site and gravel roads shall not exceed maximum allowable concentration that may affect human being and animals	SM, SF, ENC
To ensure compliance with statutory requirements	Assurance measures shall be put in place and Periodic inspections aimed at corrective action undertaken, recorded and documented	EC, PP, ENC

Table 20: Implementation of the objectives should be adhered to as indicated in the table.

<b>Objectives</b>	<b>Indicators</b>	<b>Responsibility</b>
To avoid any form of hydrocarbon spills on and around the mining site	No hydrocarbon spillage or/and remnants of hydrocarbon spillage shall be visible around the project site	Personnel on duty, Foreman on duty
To avoid any form of litter be it paper, metal, plastic and human waste on and around the mining site	No litter or/and remnants of litter shall be visible around the project site	All employees, Environmental Officer, safety, Health and Environment Manager.
To minimize land and soil disturbance	Driving tracks and excavation shall be restricted and only be visible within the project site.	Personnel on duty, Foreman on duty and Environmental Officer.
To protect and conserve fauna and flora within the project area	Minimum levels of habitat disturbance	Safety, Health and Environment Manager, Environmental Officer and personnel on duty
To minimize dust generation on site and atmospheric pollution	Emissions/generation particulate content of the dust around the site and gravel roads shall not exceed maximum allowable concentration that may affect human being and animals	Foreman on duty, Environmental Officer and Safety Health and Environment Manager.
To ensure compliance with statutory requirements	Assurance measures shall be put in place and Periodic inspections aimed at corrective action undertaken, recorded and documented	Environmental Manager, Safety Health and Environment Manager.

The following tables gives the mitigation measures to be undertaken during construction, operation, closure and decommissioning phases with the proponent responsible for implementation.

Table 21: Summary of environmental impacts, mitigation measures and monitoring plan for all project phases.

<b>Construction phase</b>			
<b>Environmental impacts</b>	<b>Proposed mitigation measures</b>	<b>Responsibility</b>	<b>Monitoring plan</b>
<b>Air pollution</b>	<ul style="list-style-type: none"> <li>• Regular maintenance of vehicles and equipments.</li> <li>• Brief workers and contractors.</li> <li>• Control speed and operation of construction vehicles.</li> <li>• Regular maintenance of vehicles, construction equipments and heavy machineries.</li> <li>• Provide workers with dust masks.</li> </ul>	Personnel on duty, Foreman on duty and Environmental Officer	<ul style="list-style-type: none"> <li>• Amount of dust produced.</li> <li>• Level of landscaping executed.</li> </ul>
<b>Noise pollution</b>	<ul style="list-style-type: none"> <li>• All noise should be kept within reasonable levels.</li> <li>• Employees and neighbors should be notified of any scheduled unusual noise.</li> <li>• Regular maintenance of vehicles, equipments and heavy machinery.</li> <li>• Workers should be provided with personal hearing protection if working in a noisy environment.</li> </ul>	Foreman on duty, Environmental Officer, Safety Health and Environment Manager.	<ul style="list-style-type: none"> <li>• Amount of noise produced</li> </ul>
<b>Solid waste</b>	<ul style="list-style-type: none"> <li>• Littering should be discouraged by having strategically placed bins and refuse skips on site.</li> <li>• Recycling plastic, paper and cans should be encouraged on site</li> <li>• The bins should be emptied on a regular basis by the proponent or an independent contractor.</li> <li>• The site should have containers with bulk storage facilities at convenient points to prevent littering.</li> </ul>	Personnel on duty, Environmental Officer and Safety Health and Environment Manager	<ul style="list-style-type: none"> <li>• Presence of dust bins/waste collection points.</li> </ul>



<b>Oil leaks and spills</b>	<ul style="list-style-type: none"> <li>• Contactor should have a sealed designated area where maintenance is carried out to prevent percolation of contaminants.</li> <li>• Oil products should be handled carefully on bounded surfaces; in case it leaks.</li> <li>• Vehicles and equipment should be well maintained to prevent oil leaks.</li> </ul>	Personnel on duty, Foreman on duty Environmental Officer and Safety Health and Environment Manager	<ul style="list-style-type: none"> <li>• Absence of oil spills and leaks on site.</li> </ul>
<b>First aid</b>	<ul style="list-style-type: none"> <li>• A well-stocked first aid kit shall be maintained by a qualified personnel.</li> </ul>	Safety Health and Environment Manager, Safety and Health Officer.	<ul style="list-style-type: none"> <li>• Contents of the first aid kits.</li> </ul>
<b>Visual</b>	<ul style="list-style-type: none"> <li>• Environmental considerations will always be adhered to before clearing roads, trenching and excavation.</li> </ul>	Safety Health and Environment Manager, Environmental Officer	<ul style="list-style-type: none"> <li>• Employees to be trained on how to minimize impacts that can easily be identified with the eye.</li> </ul>
<b>Archaeological sites</b>	<ul style="list-style-type: none"> <li>• Buffer zones will be created around the sites.</li> <li>• Adhere to practical guidelines provided by the responsible archaeologist to reduce archaeological impacts of quarrying activities.</li> <li>• All archaeological sites to be identified and protected before development commences.</li> </ul>	All personnel on duty, Environmental officer, Safety Health and Environment Manager	<ul style="list-style-type: none"> <li>• Register of all archaeological sites identified.</li> </ul>
<b>Occupational health and safety</b>	<ul style="list-style-type: none"> <li>• Provide personal protective equipments, train workers on personal safety, and how to handle equipments and machines.</li> <li>• A well-stocked first shall be maintained by qualified personnel.</li> <li>• Report any accidents/ incidences and treat and compensate affected workers.</li> </ul>	Safety and Health Officer, Safety Health and Environment Manager	<ul style="list-style-type: none"> <li>• Workers using personal protective equipments.</li> <li>• Availability of a well-stocked first aid box.</li> </ul>

	<ul style="list-style-type: none"> <li>• Provide sufficient and suitable sanitary conveniences which should be kept clean.</li> </ul>		<ul style="list-style-type: none"> <li>• Clean sanitary facilities.</li> </ul>
<b>Fauna</b>	<ul style="list-style-type: none"> <li>• Some habitat areas such as the river and tunnel outcrops will be avoided wherever possible.</li> <li>• A fauna survey will be conducted to determine the effect of fragmented habitat to game species should the need arise.</li> <li>• No animals shall be killed, capture or harmed in any way.</li> <li>• No food stuff shall be left lying around as this will attract animals which may result in human-animal conflict.</li> </ul>	Personnel on duty, Environmental Officer, Safety Health and Environment Manager	<ul style="list-style-type: none"> <li>• Regular monitoring of any unusual signs of animal habitat.</li> </ul>
<b>Alien invasive plants</b>	<ul style="list-style-type: none"> <li>• Ensure vehicles and equipment are clean of invasive plants and seeds.</li> <li>• Eradicating alien plants using area management plan.</li> <li>• Contain neighboring infestations and restrict movement of invasive plants from adjacent lands</li> <li>• Educating everyone on site on types of invasive plants.</li> </ul>	Environmental Officer, Environmental Manager	<ul style="list-style-type: none"> <li>• Regular monitoring of any signs of alien plants.</li> </ul>
<b>Loss of vegetation</b>	<ul style="list-style-type: none"> <li>• Environmental considerations will be adhered to at all times before clearing roads, trenching and excavating.</li> <li>• The movement of vehicles in riverbeds, rocky outcrops and vegetation sensitive area will be avoided.</li> <li>• The movement of vehicles will be restricted to certain tracks only.</li> </ul>	Environmental Officer, Safety Health and Environment Manager	<ul style="list-style-type: none"> <li>• Warning signs on site</li> <li>• Restored vegetation</li> </ul>

<b>Operational Phase</b>			
<b>Environmental /Social Impact</b>	<b>Proposed mitigation measures</b>	<b>Responsibility</b>	<b>Monitoring plan</b>
<b>Noise pollution</b>	<ul style="list-style-type: none"> <li>• All noise should be kept within reasonable levels.</li> <li>• Employees and neighbors should be notified of any scheduled unusual noise.</li> <li>• Regular maintenance of vehicles, equipment and heavy machinery.</li> <li>• Workers should be provided with personal hearing protection if working in a noisy environment.</li> </ul>	All employees, Safety Health and Environment Manager Environmental Officer	<ul style="list-style-type: none"> <li>• Amount of noise produced</li> </ul>
<b>Visual</b>	<ul style="list-style-type: none"> <li>• Environmental considerations will be adhered to at all times before clearing roads and excavations</li> </ul>	Safety Health and Environment Manager Environmental officer	<ul style="list-style-type: none"> <li>• Employees to be trained on how to minimize visual impacts</li> </ul>
<b>Fauna</b>	<ul style="list-style-type: none"> <li>• Some habitat areas will be avoided where possible.</li> <li>• A fauna survey will be conducted to determine the effects of fragmented habitat game species should the need arise.</li> <li>• No animal shall be kept, captured, killed or harmed in any way.</li> <li>• No food stuff will be left lying around as these will attract animals which may result in human-animal conflict.</li> </ul>	All employees, Environmental officer Safety Health and Environment Manager	<ul style="list-style-type: none"> <li>• Regular monitoring of unusual signs of animal habitat.</li> </ul>
<b>Alien invasive plants</b>	<ul style="list-style-type: none"> <li>• Ensure debris is properly disposed of.</li> <li>• Ensure vehicles and equipment are clean of invasive plants and seeds.</li> <li>• Contain neighboring infestations and restrict movement of invasive plants from adjacent lands</li> <li>• Educating everyone on site on types of invasive plants. Eradicating alien invasive plants by using an area</li> </ul>	Safety Health and Environment Manager Environmental officer Foreman and personnel on duty	<ul style="list-style-type: none"> <li>• Regular monitoring of any signs of alien invasive plants</li> </ul>

	management plan.		
<b>Loss of vegetation</b>	<ul style="list-style-type: none"> <li>• Environmental considerations will be adhered to at all times before clearing roads, trenching and excavations.</li> <li>• Paths and roads will be aligned to avoid root zones.</li> <li>• Permeable materials will be used where ever possible.</li> <li>• Movement of vehicles in riverbeds, rocky outcrops and vegetation sensitive areas will be avoided and restricted to certain tracks only.</li> </ul>	Safety Health and Environment Manager	<ul style="list-style-type: none"> <li>• Restored vegetation</li> </ul>
<b>Solid waste</b>	<ul style="list-style-type: none"> <li>• Minimize solid waste generated on site.</li> <li>• Encourage segregation of waste on site</li> <li>• Debris should be collected by waste collection contractor.</li> <li>• Excavated waste should be piled at a designated approved location.</li> </ul>	Safety Health and Environment Manager Environmental Officer All foremen, personnel on duty	<ul style="list-style-type: none"> <li>• Amount of waste on site.</li> <li>• Availability of dust bins, waste collection point.</li> </ul>
<b>Oil leaks and spills</b>	<ul style="list-style-type: none"> <li>• Machinery should be well maintained to prevent oil leaks.</li> <li>• Contractors should have a designated area where maintenance is carried out and should be underlain by impermeable layer.</li> <li>• Workshops should be bounded by concrete</li> </ul>	Environmental Officer, Safety Health and Environment Manager, Foremen, personnel duty	<ul style="list-style-type: none"> <li>• No observed/detected oil spills and leaks on site</li> </ul>

<b>Archaeological sites</b>	<ul style="list-style-type: none"> <li>• Buffer zones will be created around the sites.</li> <li>• Adhere to practical guidelines provided by an archaeologist to reduce archaeological impact of quarrying activities.</li> <li>• All archaeological sites to be identified and protected before further quarrying commences.</li> </ul>	Environmental and safety manager	<ul style="list-style-type: none"> <li>• Up to date register of all archaeological sites identified in the vicinity.</li> </ul>
<b>First aid</b>	<ul style="list-style-type: none"> <li>• A well-stocked first aid kit shall be maintained by qualified personnel.</li> </ul>	Safety and health Officer,  Safety Health and Environment Manager	<ul style="list-style-type: none"> <li>• Contents of the first aid kit.</li> </ul>
<b>Fire preparedness</b>	<ul style="list-style-type: none"> <li>• Fire incidence firefighting emergency response plan.</li> <li>• Ensure all firefighting equipments are always available regularly maintained, serviced and inspected.</li> <li>• Fire hazard signs and directions to emergency exit, route to follow and assembly point in case of any.</li> </ul>	Health safety officer Safety Health and Environment Manager	<ul style="list-style-type: none"> <li>• Fire signs put up in strategic places.</li> <li>• Availability of well-maintained firefighting equipments.</li> </ul>
<b>Environmental health and safety</b>	<ul style="list-style-type: none"> <li>• Train workers on personal safety and disaster preparedness.</li> <li>• Provide sufficient and suitable sanitary conveniences which should be kept clean.</li> <li>• Conduct annual health and safety audits.</li> <li>• Report any accidents/incidences, treat and compensate affected workers.</li> <li>• A well-stocked first aid kit shall be maintained by qualified personnel.</li> </ul>	Safety Health and Environment Manager	<ul style="list-style-type: none"> <li>• Provide sanitary facilities.</li> <li>• Copies of annual audit.</li> </ul>

<b>Decommissioning phase</b>			
<b>Impacts</b>	<b>Proposed mitigation measures</b>	<b>Responsibility</b>	<b>Monitoring plan/Indicator</b>
<b>Noise and air pollution</b>	<ul style="list-style-type: none"> <li>• Personal hearing protection must be worn by workers in noisy section.</li> <li>• Regular maintenance of vehicles, equipments, heavy machinery on regular basis.</li> <li>• Workers should be provided with dust mask to wear at all times.</li> <li>• Decommissioning work can only be carried out during the day.</li> </ul>	Health safety and Environment Manager  Environmental Officer	<ul style="list-style-type: none"> <li>• Amount of noise and dust generated</li> </ul>
<b>Disturbed physical environment</b>	<ul style="list-style-type: none"> <li>• Undertake a complete a complete environmental restoration programme and introducing appropriate vegetation for ground stabilization.</li> </ul>	Health safety and Environment Manager  Environmental Officer	
<b>Solid waste</b>	<ul style="list-style-type: none"> <li>• Solid waste should be collected by contracted waste collection company.</li> <li>• Excavation waste should be used or backfilled</li> <li>• Open pit must be fenced of o avoid animals and unauthorized people from entering.</li> <li>• Waste dumps must be sloped and lined with top soil to allow re-germination of grasses</li> </ul>	Health safety and Environment Manager  Environmental Officer	<ul style="list-style-type: none"> <li>• Amount of waste on site.</li> <li>• Presence of well-maintained receptacles and central collection point.</li> </ul>
<b>Occupational health and safety</b>	<ul style="list-style-type: none"> <li>• Train workers on personal safety and how to handle equipments and machines.</li> <li>• Provide personal protective equipments (PEE).</li> </ul>	Health and safety officer,	<ul style="list-style-type: none"> <li>• Workers using protective equipments.</li> <li>• Availability of a first aid box.</li> </ul>

	<ul style="list-style-type: none"><li>• A well-stocked first aid kits shall be maintained by qualified personnel.</li><li>• Demarcate area under decommissioning.</li></ul>	Environmental Officer, Health safety and Environment manager	
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## **7.3 Monitoring, reporting and corrective action**

### **7.3.1 Monitoring of EMP**

Monitoring of the EMP performance for the proposed project by the Contractor emphasizes early detection, reporting, and corrective action. It is divided into three parts, namely:

- Monitoring of project activities and actions to be undertaken by the Environmental Coordinator (ENC) appointed by the Contractor.
- The Environmental Coordinator (ENC) shall report all incidents and situations which have the potential of jeopardizing compliance of statutory provisions as well as provisions of this EMP to the Project Proponent.
- The Environmental Coordinator (ENC) shall take corrective prompt measures, adequate and long-lasting in addressing non-compliance activities or behavior.
- To ensure compliance of the Contractor ENC to the implementation of the EMP, it is highly recommended that an External Environmental Expert is appointed by the proponent to ensure the implementation of the EMP.

### **7.3.2 Inspections and Audits**

During the life of the project, performance against the EMP commitments will need to be monitored and corrective action taken where necessary, in order to ensure compliance with the EMP and relevant environ-legal requirements.

#### **Internal Inspections/Audits**

The following internal compliance monitoring programme will be implemented:

1. Project kick-off and close-out audits will be conducted on all contractors. This applies to all phases during exploration:



- Before a contractor begin any work, an audit will be conducted by the applicable phase site manager to ensure that the EMP commitments are included in Contractors' standard operating procedures (SOPs) and method statements.
  - Following completion of a Contractors work, a final close-out audit of the contractor's performance against the EMP commitments will be conducted by the applicable phase site manager.
2. Monthly internal EMP performance audits will be conducted during the construction/initial and decommissioning phases.
  3. Ad hoc internal inspections can be implemented by the applicable manager at his/her discretion, or in follow-up to recommendations from previous inspection/audit findings.

### **External Audits**

- At the end of each project phase, and annually during the exploration phase, an independently conducted audit of EMP performance will be conducted.
- Specialist monitoring/auditing may be required where specialist expertise are required or in order to respond to grievances or authorities directives.
- Officials from the DEA may at any time conduct a compliance and/or performance inspection of exploration activities. The proponent will be provided with a written report of the findings of the inspection. These audits assist with the continual improvement of the exploration project and the proponent will use such feedback to help improve its overall operations.

### **Documentation**

Records of all inspections/audits and monitoring reports will be kept in line with legislation. Actions will be issued on inspection/audit findings. These will be tracked and closed out.

## **Reporting**

Environmental compliance reports will be submitted to the Ministry of Environment, Forestry and Tourism on a bi-annual basis.

## **Environmental management system framework**

Environmental Management System (EMS) will be established and implemented by the proponent and their Contractors. This subchapter establishes the framework for the compilation of a project EMS. The applicable manager will maintain a paper based and/or electronic system of all environmental management documentation. These will be divided into policy and performance standards & Enviro legal documentation.

## **Policy and Performance Standards**

A draft environmental policy and associated objective, goals and commitments has been included in the EMP. The project proponent may adapt these as necessary.

## **Enviro-Legal Documentation**

A copy of the approved environmental assessment and EMP documentation will always be available by the proponent. Copies of the Environment Clearance Certificate and all other associated authorizations and permits will also be kept with the exploration team. In addition, a register of the legislation and regulations applicable to the project will be maintained and updated as necessary.

## **Impact aspect register**

A register of all project aspects that could impact the environment, including an assessment of these impacts and relevant management measures, is to be maintained. This Draft EMP identifies the foreseeable project aspects and related potential impacts of the proposed project, and as such forms the basis for the Aspect Impact Register; with the Project Activity. It should however be noted that during the life of the project additional project aspects and related impacts may arise which would need to be captured in the Aspect-Impact Register.

## **Procedures and Method Statements**

In order to affect the commitments contained in this EMP, procedures and method statements will be drafted by the relevant responsible exploration staff and Contractors. These include, but may not be limited:

- Standard operating procedures for environmental action plan and management programme execution.
- Incident and emergency response procedures.
- Auditing, monitoring and reporting procedures, and
- Method statements for EMP compliance for ad hoc activities not directly addressed in the EMP action plans.

All procedures are to be version controlled and signed off by the applicable manager. In addition, knowledge of procedures by relevant staff responsible for the execution thereof must be demonstrable and training records maintained.

## **Register of roles and responsibilities**

During project planning and risk assessments, relevant roles and responsibilities will be determined. These must be documented in a register of all environmental commitment roles and responsibilities. The register is to include relevant contact details and must be updated as required.

## **Environmental management schedule**

A schedule of environmental management actions is to be maintained by the applicable phase site managers and/or relevant Contractors. A master schedule of all such activities is to be kept up to date by the manager. Scheduled environmental actions can include, but are not limited to:

- Environmental risk assessment;
- Environmental management meetings;
- Soil handling, management and rehabilitation;
- Waste collection;

- Incident and emergency response equipment evaluations and maintenance
- Environmental training;
- Stakeholder engagement;
- Environmental inspections and
- Auditing , monitoring and reporting

### **Change Management**

The environmental management schedule must have a procedure in place for change management. In this regard, updating and revision of environmental documentation, of procedures and method statements, actions plants etc. will be conducted as necessary in order to account for the following scenarios:

- Changes to standard operating procedures (SOPs);
- Changes in scope;
- Ad hoc actions;
- Changes in project phase; and
- Changes in responsibilities or roles

All documentation will be version controlled and require sign off by the applicable phase site managers.

### **7.4 Environmental code of conduct**

The Code of Conduct outlined in this section of the EMP applies to, sub-contractors, visitors, permanent and temporal workers. Therefore, anybody within the boundaries of the project site must adhere to the Environmental Code of Conduct as outlined in this section of the EMP. The Environmental Coordinator ENC will implement on-site environmental guidelines and has the authority to issue warnings as well as discipline any person who transgresses environmental rules and procedures. Persistent transgression of environmental rules will result in a disciplinary hearing and thereafter continued noncompliance behavior will result in permanent removal from the construction sites.

## **7.5 Site closure and rehabilitation**

Rehabilitation is the process of repairing the damage done by exploration activities. Rehabilitation plan has been developed with a main aim of returning disturbed environment close to its pre exploration state. It is also planned to cater for the access road, vehicle tracks around the site, removal, and restoration of areas covered by stockpile and rock piles. The closure vision for the proposed project is to establish a safe, stable and non-polluting post-prospecting landscape that can facilitate integrated, self-sustaining and value generating opportunities, thereby leave a lasting positive legacy.

### **Site closure and rehabilitation activities**

All waste (such as hazardous and domestic) waste will be transported offsite for disposal in licensed landfills in Karibib town. Disturbed or/and contaminated areas will be cleaned up, treated where necessary and restored to its pristine state.

- Demolition of camping structures.
- Removing of equipment on site.
- Removal of associated infrastructures such as storage tanks, solar panels and heavy-duty generators.
- Where access tracks have been developed in cases where there are no roads, these will be rehabilitated and closed as part of normal closure actions in consultation with landowners.
- Existing secondary roads in the area should be used to prevent damages of the main road.
- The recovered topsoil and subsoil should be utilized to reconstruct the original soil profile.

The rehabilitation actions intended to be undertaken at the end of the life of the proposed exploration activities are described below.

## **Remediation of Contaminated Areas**

All soil, contaminated with hydrocarbons, will be identified, excavated and disposed in accordance with nearest town council disposal requirements at appropriate sites.

- Removed soils will be managed as determined by the nature and extent of the contamination.
- All equipment in which chemicals have been stored or transported will be cleaned and disposed of in a suitable disposal facility.

## **Waste Management**

Waste management activities will include:

- Hazardous waste will be managed handled, classified and disposed.
- No burring and burying of waste.
- Nonhazardous substances will be disposed in the nearby landfill sites.
- It may be necessary to fence temporary salvage yards for security reasons, particularly where these are located close to public roads.

## **8. Public Consultation**

### **8.1 Legal framework**

Public consultation is an important part of an environmental impact assessment process. Public consultation gives an opportunity to stakeholders or interested members of the public to get more information on the proposed project and to raise any issues or concerns. The Environmental Management Act 2007 and its EIA regulations of 2012 are the tools governing environmental impact assessment in Namibia. Among the important objectives of the Act is to prevent and

mitigate the significant effects of activities on the environment by ensuring that interested and affected parties are afforded opportunity to participate throughout the assessment process; and ensuring that the findings of an assessment are taken into account before any decision is made in respect of activities.

In terms of Section 21 of the EIA Regulations, the person conducting a public consultation process must give notice to all potential interested and affected parties by:

- a) Fixing a notice board at a place conspicuous to the public at the boundary or on the fence of the site where the activity to which the application relates is or is to be undertaken;
- b) Giving written notice to:
  - i. The owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site;
  - ii. The local authority council, regional council and traditional authority, as the case may be, in which the site or alternative site is situated;
  - iii. Any other organ of state having jurisdiction in respect of any aspect of the activity; and
- c) Advertising the application once a week for two consecutive weeks in at least two newspapers circulated widely in Namibia.

In line with the provisions of the regulations, the public notices (attached) were published in the local newspapers during the months of May to June 2022. The public consultation process started on 30 May 2022 and the closing date for registration and submission of written objections, comments, inputs to the environmental assessment process was initially 19 June 2022 which was extended to the 30 June 2022. The EIA Regulations clearly state that potential interested and affected parties must be provided with a reasonable opportunity (21 days) to comment on the application under Section 21(6) of the EIA Regulations.

A stakeholder's register as shown in Table 27 was created on the 30<sup>th</sup> of May 2022. The public meeting was held on the last day of the consultation process (18 June 2022) at Usab Community Hall in Karibib. The meeting's attendance register, minutes and photos are annexed to this report. The public were invited through the newspaper advertisements (annexed to this report) to submit written comments / inputs / objections on the proposed minerals exploration activities. The background information document (BID) annexed to this report was provided to all the registered stakeholder and to all identified I&APs, so far no submissions was received.

Table 22: Registered stakeholders (register was made available from 01 June 2022).

No.	Name	Affiliation	Contact Details
1	Gerael Appriels		Contact no. : +264 81 48 588 31
2	Manuel Numbo	Small scale miner (Erongo Region)	Contact no. : +264 81 49 74418
3	Ivano Sima		<a href="mailto:ivano.sima@gmail.com">ivano.sima@gmail.com</a>
4	Elina Hamatwi Lumbu	Roads authority	<a href="mailto:lumbue@ra.org.na">lumbue@ra.org.na</a>
5	Mr Hoffman Trust	Independent Geologist	Contact no. : +264 811 28 3520

## 8.2 Public and Stakeholder Consultation Outcomes

**Concerns and comments raised by interested parties as follows:**

### **Elina Mr Manuel Neumbo**

- ✓ Lot of areas taken by EPLs, locking out small scale miners
- ✓ Some EPL holders are not willing to permit small scale miners into their EPLs
- ✓ Small scale miners plan to engage the Ombudsman on the above issue



**Elina Hamatwi Lumbu from Roads authority**

- Any exploration within 30m on either side of the road permission needs to be obtained from the Roads Authority.
- If drilling will have an effect on the layers of the road), permission should be obtained from the Roads Authority.

**The information given below was shared the concerned parties to shade more light in response to concerns raised:**

- Entry only with Knowledge and permission of the landowner.
- Initial stages: thematic mapping to delineate various land use zones and patterns to help improve the multiple land use practices and promote coexistence for all the possible land use options.
- In the initial stages: mainly desktop studies (aerial geophysics, remote sensing and Landsat images interpretations) supported by probably 1- or 2-days field verifications.
- Once more information on target areas has been obtained frequent field target verifications: mapping/ sampling visits/ trenching/ drilling, but this will only be over specific areas of interest and not the entire EPL.
- The only parts to be physically visited are areas of interest and this tends to be a localized involving only small area where mineralization occurs.
- Field verifications of targets will only be done with the permission and knowledge of the landowner.
- It is very unlikely that the entire EPL will be an area of interest because this is never the case and there is no way it would happen with this EPL.
- A land/farm access Agreement will be negotiated between the EPL holder (Proponent) and the landowner (farmer) stipulating conditions of access.
- The land access agreement will include among other important issues such as adherence to Environmental Management Plan which focuses on environmental mitigation measures.
- EMP will cover issues raised by interested and affected parties (I&APs)

- The project can only advance in to mining if resources of economic potential are discovered.
- Statistics shows that the likelihood of any EPL to advance to a mining stage is less than 0.01.
- If the exploration activities were to advance to mining stage, it's a process that would take time (on average up to 10 years) and landowners as well as I&APs will be consulted throughout the whole development process.
- If the proposed exploration activities lead to a discovery of a mineral resource of economic potential, prefeasibility and feasibility studies will then be carried out over the local area hosting the mineralization.
- During the prefeasibility and feasibility studies, a detailed site-specific Environmental Impact Assessment (EIA) study will be carried out and an Environmental Management Plan (EMP) report will be prepared and these will be done in consultation with all interested and affected parties including the landowner.
- If a deposit of economic potential was to be discovered, the benefits would be big. It would boost the economy of the constituency and it will better the livelihood of many people in the region

## **9. Conclusion**

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The proponent intends to carryout exploration activities on EPL 8741 for nuclear fuel metals. The proposed exploration activities include desktop studies, geophysical surveys, geochemical survey, geological mapping, trenching, drilling and geochemical sampling as well as laboratory analysis aimed discovering mineral resources of economic interest. Potential positive and negative impacts of the proposed exploration activities on the EPL 8741 were identified, assessed, and mitigation measures are provided in the EMP. These mitigation measures and recommendations provided are deemed sufficient to minimize the identified impacts to acceptable levels. This is to ensure that all

potential impacts identified in this study and other impacts that might arise during the exploration activities are properly addressed on time.

The Environmental Management Plan should be used as an on-site reference document during all phases of the proposed project, and auditing should take place in order to ensure compliance with the EMP of the proposed project. Parties responsible for transgression of the EMP should be held responsible for any rehabilitation that may need to be undertaken. Overall, the severity of potential environmental impacts of the proposed project activities on the receiving environment (physical, biological, socioeconomic environments and ecosystem functions) will have low probability of occurrence, localized extent, and low magnitude and temporally duration. This report should be viewed as a framework for integrating mitigation measures and applicable legal tools to ensure both compliance and sustainability. It is therefore very important that the proponent provides adequate support for human and financial resources, for the implementation of the proposed mitigations and effective environmental management during the planned exploration activities.

## **10. Recommendations**

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Therefore, it is recommended that the mineral exploration activities on the project site be granted an Environmental Clearance Certificate, provided that: All mitigations provided in this EMP should be implemented as stipulated and where required and emphasized, improvement should be effectively put in place. The Proponent and all their workers comply with the legal requirements governing this type of project and its associated activities.

In a summary the following are to be observed to:

- The proponent should take all the necessary actions to implement the EMP to minimize adverse impacts on the environment.

- The proponent is to observe all the provisions of the EMP and all conditions of the access agreement to be entered between the proponent and the landowners.
- The proponent to give advance notices and obtain permission to have access to private property such as private farms from the landowners.
- The exploration activities should be conducted in line with the EMP, thus implementing the necessary mitigation measures, monitoring and stipulated rehabilitation measures.
- In a case where portable water is discovered during boreholes drilling operations, the proponent shall support other land users in the area in terms of access to freshwater supply for both human consumption, wildlife and agricultural support as may be requested by the local community / landowners/s. Relevant underground water abstraction permit/s be obtained from the Ministry of Agriculture, Water and Land Reform (MAWLR) and abstraction and monitoring conditions thereof be observed.

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## Appendix A: Registered IAP's

Name	Organization	Tel	Email
B. Korhs	Earth life Namibia	061-2022041	earthl@iway.na
C. Sisamu	Nampower	061-2052350	Calvin.Sisamu@nampower.com.na
C. Tubalike	MURD	061-2975062	ctubalike@murd.gov.na
Coleen Mannheimier	061-2022021	manfam@iafrica.com.na	
E de Paauw	Roads Authority - Specialized road Legislation, Advise & Compliance	061-2847027	dePaauwe@ra.org.na
E Muremi	Ministry of Health and Social Services Director Khomas Region	061-2035001	Elizabeth.Muremi@mhss.gov.na
E. Shivolo	Min. of M&E - Mining Commissioner	061-2848111	Erasmus.Shivolo@mme.gov.na
Esmerialda Strauss	CHIEF FORESTER National Botanical Research Institute (NBRI)	061-2022017	Esmerialda.Strauss@mawf.gov.na
F Kreitz	Namibian Environment and Wildlife Society - Media, website and newsletter	061-306450	Information@NEWS-Namibia.org;
F. Sikabongo	MET - Deputy Director of Directorate of Environmental Affairs	061-2842701	frederick.Sikabongo@mef.gov.na
Fransiska Nghitila	NWR-Environmental and Compliance Specialist	061-2857190	Fnghitila@nwr.com.na; fnghitila@gmail.com
Sonja Loots	Manager: Threatened Plants Programme, National Botanical Research Institute	061-2022014	Sonja.Loots@mawlr.gov.na sonja.loots.solo@gmail.com
Town clerk	Karibib Town Council	064- 570 028	Townclerk@Karibib.na

**Appendix B: Proof of Advertisements, Letters and Notices**

**Appendix C: CV of EAP**

**Appendix D: BID**