

Environmental Scoping Assessment (ESA) Report for:

**THE PROPOSED MINING ACTIVITIES ON MINING CLAIMS
(MCs) No. 73632 – 73665 LOCATED SOUTHEAST OF
KARIBIB IN THE ERONGO REGION, NAMIBIA**



January 2022



Excel Dynamic Solutions

— Consultants: Data Experts, Project Managers —

Document Version:

Final

ECC APP : 00786

<p>Author: Ms Aili lipinge</p> <p>Reviewer: Ms Rose Mtuleni</p> <p>Company: Excel Dynamic Solutions (Pty) Ltd</p> <p>Telephone: +264 (0) 61 259 530</p> <p>Fax2email: +264 (0) 886 560 836</p> <p>Email: info@edsnamibia.com / public@edsnamibia.com</p>	<p>Proponent: Neu –Shwabens Independent Miners Association cc</p> <p>Contact person: Mr. Gert Nauseb</p> <p>Telephone: +264 (0) 81 413 758 0</p> <p>Postal Address: P.O. Box 380, Karibib; Namibia</p> <p>Email: muiras@erongorc.gov.na</p>
--	--

January 2022

EXECUTIVE SUMMARY

Artisanal and small-scale mining are considered potential poverty reduction activities in Namibia. In the Erongo region, several vulnerable people are engaged in small-scale mining to generate income. The industry is concentrated mainly on semi-precious stones, such as tourmaline, smoky quartz, beryl, amethyst, prehnite, rock crystals and schorl. For this reason, the Ministry of Mines and Energy (MME) has recognized the need to enhance the quality of life for artisanal and small-scale miners working outside of formal legal and economic systems. Although it is recognized that small-scale mining creates employment opportunities for many and encourages entrepreneurship, majority of the small-scale mining activities have been taking place illegally.

Neu-Schwaben Independent Miner's Association CC intends to continue with small-scale mining activities of Semi-Precious Stones on Mining Claims (MCs) No. 73632 – 73665 which have a combined area of 17,911.47-hectares. The Mining Claims (MCs) were recently issued an ECC as MCs 66788 – 66821 which expired on the 29 October 2022. These 34 MCs are located about 20km south-east of Karibib. Farm Neu - Schwaben No. 148, is one of the hotspots in Erongo Region where small-scale mining activities have been taking place for many years. The proponent is interested in conducting the small-scale mining activities for Industrial Minerals and Semi – Precious Stones. This report contains a full description of the small-scale mining activities, description of the receiving or affected environment in terms of the biophysical aspects of climate, water, vegetation, geography, topography, and the socio-economic environments. The report is to be read in conjunction with the Environmental Management Plan (EMP) appended to this report.

The application for the ECC was compiled and submitted to the Ministry of Environment, Forestry and Tourism (MEFT) as it is the competent authority. Upon submission of an Environmental Scoping Assessment (ESA) Report and Draft Environmental Management Plan (EMP), an ECC for the proposed project will be considered by the Environmental Commissioner at the MEFT's Department of Environmental Affairs and Forestry (DEAF).

TABLE OF CONTENTS

EXECUTIVE SUMMARY i

LIST OF FIGURES iv

LIST OF TABLES iv

LIST OF APPENDICES v

LIST OF ABBREVIATIONS v

1 INTRODUCTION 1

 1.1 Project Background 1

 1.2 Terms of Reference and Scope of Works 1

 1.3 Appointed Environmental Assessment Practitioner 1

 1.4 The Need for the Proposed Project..... 1

2 PROJECT DESCRIPTION: PROPOSED MINING ACTIVITY..... 2

 2.1 Pre-development Phase 2

 2.2.1 Accessibility to Site..... 3

 2.2.2 Material and Equipment..... 3

 2.2.3 Human Resources 5

 2.2.4 Project Crew Accommodation 5

 2.2.5 Services and Infrastructure..... 5

 2.3 Decommissioning and Rehabilitation Phase 6

3. PROJECT ALTERNATIVES 7

 3.1 Types of Alternatives Considered 7

4. LEGAL FRAMEWORK: LEGISLATION, POLICIES AND GUIDELINES 9

 4.1 The Environmental Management Act (No. 7 of 2007) 9

 4.2 International Policies, Principles, Standards, Treaties and Conventions 18

5. ENVIRONMENTAL BASELINE 22

 5.1 Climate 23

 2.1 Topography..... 24

 5.3 Geology and Soil 26

 5.4 Water Resources: Hydrology and Groundwater..... 31

 5.5 Fauna and Flora..... 36

 5.5.1 Fauna 36

 5.5.2 Flora..... 38

5.6	Archaeology and Heritage	42
5.6.1	Regional Level	42
5.7	Surrounding Land Uses.....	45
5.8	Socio-Economic conditions	46
5.8.1	Demography.....	47
5.8.2	Mining.....	47
5.8.3	Infrastructure and Services	47
6.	PUBLIC CONSULTATION PROCESS	48
6.1	Pre-identified and Registered Interested and Affected Parties (I&APs)	48
6.2	Communication with I&APs	49
6.3	Feedback from Interested and Affected Parties	51
7	IMPACT IDENTIFICATION, ASSESSMENT AND MITIGATION MEASURES.....	52
7.1	Impact Identification	52
7.2	Impact Assessment Methodology.....	53
7.2.1	Extent (spatial scale).....	54
7.2.2	Duration	54
7.2.3	Intensity, Magnitude / severity.....	55
7.2.4	Probability of occurrence.....	55
7.2.5	Significance	56
7.3	Assessment of Potential Negative (Adverse) Impacts.....	58
7.3.1	Disturbance to the grazing areas	58
7.3.2	Land Degradation and Loss of Biodiversity.....	59
7.3.3	Generation of Dust (Air Quality)	61
7.3.4	Water Resources Use	61
7.3.5	Soil and Water Resources Pollution	63
7.3.6	Waste Generation	65
7.3.7	Occupational Health and Safety Risks	66
7.3.8	Vehicular Traffic Use and Safety	68
7.3.9	Noise and vibrations.....	69
7.3.10	Disturbance to Archaeological and Heritage resources	70
7.3.11	Impact on Local Roads	72
7.3.12	Social Nuisance: Local Property intrusion and Disturbance or Damage.....	73

7.3.13	Social Nuisance: Job seeking and Differing Norms, Culture and Values.....	74
7.4	Cumulative Impacts Associated with Proposed Mining	75
7.5	Mitigations and Recommendations for Rehabilitation	75
8	RECOMMENDATIONS AND CONCLUSIONS	76
8.1	Recommendations	76
8.2	Conclusion.....	77
9	REFERENCES	78

LIST OF FIGURES

Figure 1:	Location of MCs 73632 – 73665 south-east of Karibib in the Erongo Region	1
Figure 2:	Equipment used by the Small-scale Miners observed on site	4
Figure 3	The location of MCs 73632 – 73665 on the Namibia Mining Cadastral	8
Figure 4:	Summary of the climatic conditions for the MCs area (Sources : https://www.worldweatheronline.com/Karibib-weather-averages/Erongo/na.aspx).....	23
Figure 5 (a):	Landscape of the project area	25
Figure 6:	The geology of the MCs and surrounding project area.....	28
Figure 7:	Typical rock structure around MCs 73632 – 73665	29
Figure 8:	Dominant soil types found within the area of the MCs 73632 – 73665	30
Figure 9:	Typical soil types found within the MCs’ area	31
Figure 10:	The hydrology and groundwater map of the project area	32
Figure 11:	Actual groundwater (left) and an abandoned borehole (right) at the Neu-Schwaben farm	33
Figure 12:	Groundwater Drought Risk map around the project area	34
Figure 13:	Hydrogeological map of Namibia with rock bodies’ groundwater potential with the approximate location of project site enclosed by the red circle.....	36
Figure 14:	Dominant vegetation within MCs 73632 – 73665	39
Figure 15:	General vegetation within the MCs’ vicinity	40
Figure 16 :	Distribution of the archaeological sites in Namibia with focus on Erongo Region. Source: (Kinahan, J. 2012).	43
Figure 17:	Historical cave (top) and abandoned house (bottom) within the MCs area	44
Figure 18:	Land use within the MCs area	46
Figure 19:	Site notice placed at the entrance board of Neu-Schwaben by the Chief	50
Figure 20:	Public meeting at Neu-Schwaben Farm with some of the community members and SSM workers	51

LIST OF TABLES

Table 1: Applicable local and national standards, policies and guidelines governing the small-scale mining activities..... 9

Table 2: International Policies, Principles, Standards, Treaties and Convention applicable to the project 18

Table 3: List of vegetation species of significance found within MCs 73632 – 73665 41

Table 4: Summary of Interested and Affected Parties (I&APs) 48

Table 5: Summary of main issues and comments received during the public meeting 51

Table 6: Extent or spatial impact rating 54

Table 7: Duration impact rating 54

Table 8: Intensity, magnitude or severity impact rating 55

Table 9: Probability of occurrence impact rating 55

Table 10: Significance rating scale..... 56

Table 11: Assessment of the impacts of mining on grazing areas..... 58

Table 12: Assessment of the impacts of mining on biodiversity..... 60

Table 13: Assessment of the impacts of mining on air quality 61

Table 14: Assessment of the project impact on water resource use and availability 62

Table 15: Assessment of the project impact on soils and water resources (pollution) 63

Table 16: Assessment of waste generation impact..... 65

Table 17: Assessment of the impacts of mining on health and safety 66

Table 18: Assessment of the impacts of mining on road use (vehicular traffic) 68

Table 19: Assessment of the impacts of noise and vibrations from mining 69

Table 20: Assessment of the impacts of mining on archaeological & heritage resources 70

Table 21: Assessment of mining on local services (roads and water) 72

Table 22: Assessment of social impact of community property damage or disturbance 73

Table 23: Social impact assessment of outsiders’ influx into the area (job seeking related) 74

LIST OF APPENDICES

- Appendix A:** Copy of the Environmental Clearance Certificate (ECC) Application Form
- Appendix B:** Draft Environmental Management Plan (EMP)
- Appendix C:** Curricula Vitae (CV) for the Environmental Assessment Practitioner (EAP)
- Appendix D:** Proof of public consultation meeting (EIA Notification in the newspapers (*New Era* and the *Namibian*, *Newspaper adverts*))
- Appendix E:** Copy of issued ECC
- Appendix F:** Copy of the current Non- Exclusive Licence of the MCs
- Appendix G:** Vegetation species list by National Botanic Research Institute (NBRI)

LIST OF ABBREVIATIONS

Abbreviation	Meaning
BID	Background Information Document
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CV	Curriculum Vitae
DEAF	Department of Environmental Affairs and Forestry
EA	Environmental Assessment
EAP	Environmental Assessment Practitioner
ECC	Environmental Clearance Certificate
EDS	Excel Dynamic Solutions
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental Management Plan
ESA	Environmental Scoping Assessment
GG & GN	Government Gazette & Government Notice
I&Aps	Interested and Affected Parties
IFC	International Finance Corporation
MCs	Mining Claims
MEFT	Ministry of Environment, Forestry and Tourism
MME	Ministry of Mines and Energy
PPE	Personal Protective Equipment
Reg / S	Regulation / Section
SSM	Small Scale Mining
TOR	Terms of Reference

KEY TERMS

Terms	Definition
Alternative	A possible course of action, in place of another that would meet the same purpose and need of the proposal.
Baseline	Work done to collect and interpret information on the condition/trends of the existing environment.
Biophysical	That part of the environment that does not originate with human activities (e.g., biological, physical and chemical processes).
Cumulative Impacts/Effects Assessment	In relation to an activity, means the impact of an activity that in it may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.
Decision-maker	The person(s) entrusted with the responsibility for allocating resources or granting approval to a proposal.
Ecological Processes	Processes which play an essential part in maintaining ecosystem integrity. Four fundamental ecological processes are the cycling of water, the cycling of nutrients, the flow of energy and biological diversity (as an expression of evolution).
Environment	As defined in Environmental Management Act - the complex of natural and anthropogenic factors and elements that are mutually interrelated and affect the ecological equilibrium and the quality of life, including – (a) the natural environment that is land, water, and air; all organic and inorganic matter and living organisms and (b) the human environment that is the landscape and natural, cultural, historical, aesthetic, economic and social heritage and values.
Environmental Management Plan	As defined in the EIA Regulations (Section 8(j)), a plan that describes how activities that may have significant environments effects are to be mitigated, controlled, and monitored.

Terms	Definition
Interested and Affected Party (I&AP)	In relation to the assessment of a listed activity includes - (a) any person, group of persons or organization interested in or affected by an activity; and (b) any organ of state that may have jurisdiction over any aspect of the activity. Mitigate - practical measures to reduce adverse impacts. Proponent – as defined in the Environmental Management Act, a person who proposes to undertake a listed activity. Significant impact - means an impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.
Fauna and Flora	All the animals and plants found in an area.
Mitigation	The purposeful implementation of decisions or activities that are designed to reduce the undesirable impacts of a proposed action on the affected environment.
Monitoring	Activity involving repeated observation, according to a pre-determined schedule, of one or more elements of the environment to detect their characteristics (status and trends).
Proponent	Organization (private or public sector) or individual intending to implement a development proposal.
Public Consultation/Involvement	A range of techniques that can be used to inform, consult or interact with stakeholders affected by the proposed activities.
Protected Area	Refers to a protected area that is proclaimed in the Government Gazette according to the Nature Conservation Ordinance number 4 of 1975, as amended.
Scoping	An early and open activity to identify the impacts that are most likely to be significant and require specialized investigation during the EIA work. Can, also be used to identify alternative project designs/sites to be assessed, obtain local knowledge of site and surroundings, and prepare a plan for public involvement. The results of scoping are frequently used to prepare a Terms of Reference for the specialized input into full EIA.
Terms of Reference (ToR)	Written requirements governing full EIA input and implementation, consultations to be held, data to be produced and form/contents of the EIA report. Often produced as an output from scoping.

1 INTRODUCTION

1.1 Project Background

Small-scale mining activities is one of the major mining activities that is occurring at Farm Neu-Schwaben No. 148. The MCs are located about 19 km South of Karibib in Erongo region. The locality of the MCs is shown in **(Figure 1)**. This mainly include artisanal and semi-mechanized methods which are used in extracting a wide range of gemstones such as Amethyst, Topaz, Smoky Quartz, rock crystals, etc. These Mining Claims were issued an ECC on the 29th of October 2019 and expired on the 29th of October 2022 (Appendix G) under MCs 66788 - 66821. For this reason, the application for conducting small-scale mining activities on Mining Claims (MCs) No. 73632 – 73665 was submitted to MME on the 24 August 2022, thus “application ” status on the mining cadaster portal (<https://portals.landfolio.com/namibia/>).

Section 27 (1) of the Environmental Management Act (EMA) (No. 7 of 2007) and its 2012 Environmental Impact Assessment (EIA) Regulations, provides a list of activities that may not be carried out without an Environmental Impact Assessment (EIA) undertaken and an Environmental Clearance Certificate (ECC) obtained. Small-scale mining activities are listed among the activities that may not occur without an ECC. The small-scale mining activities at Farm Neu-Schwaben have triggered several listed activities, hence this study.

In order to facilitate the development of the EMP and subsequent issuance of an ECC by the Environmental Commissioner, the Ministry of Mines and Energy (MME) has appointed Excel Dynamic Solutions (Pty) Ltd (EDS) to carry out the Environmental Scoping assessment and prepare an EMP to assist Small-Scale Mining in this area to comply with the statutory requirements.

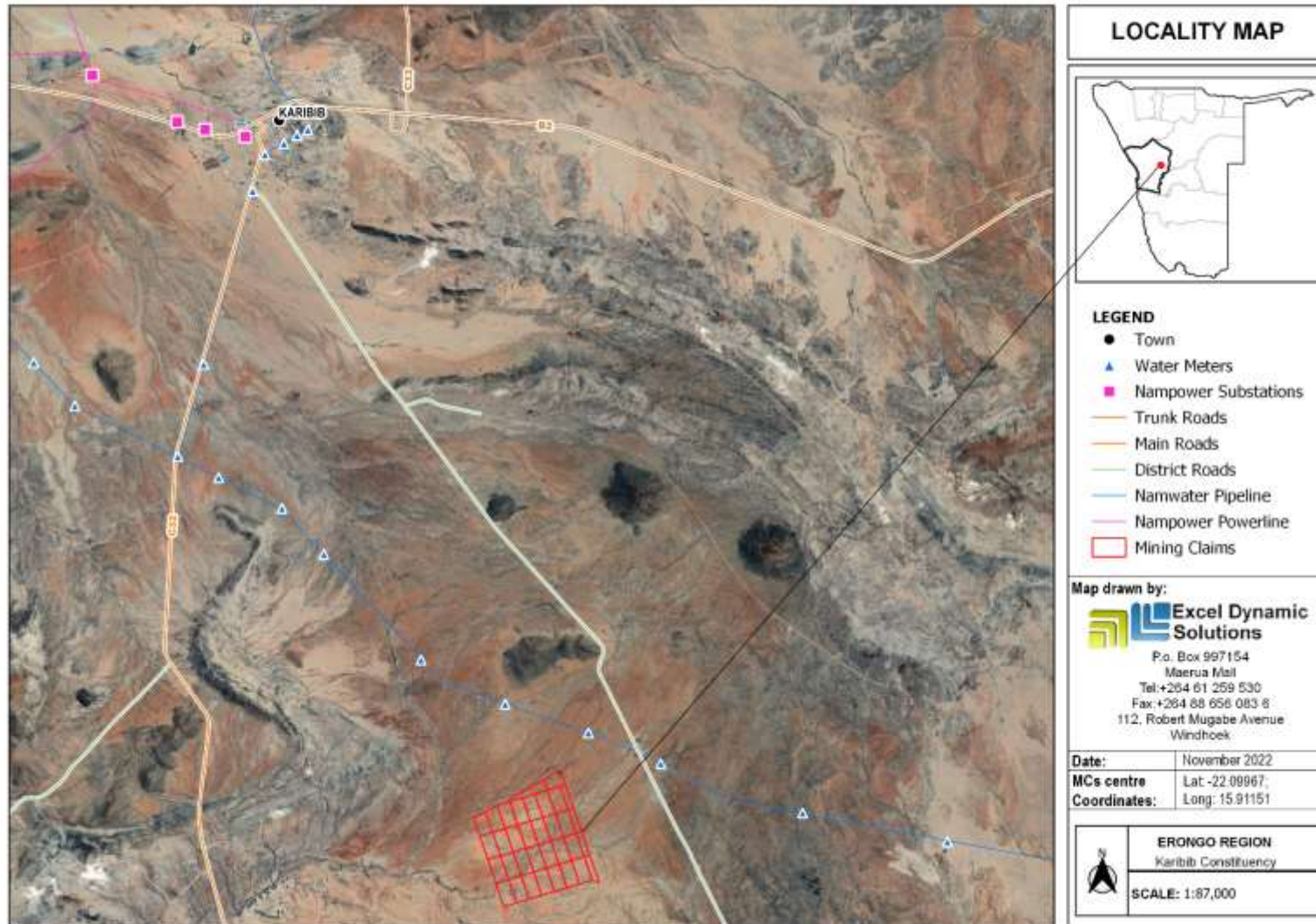


Figure 1: Location of MCs 73632 – 73665 south-east of Karibib in the Erongo Region

1.2 Terms of Reference and Scope of Works

EDS has been appointed by the MME to undertake an environmental assessment, and thereafter, apply for a renewal of the ECC for SSM activities on the MCs. There were no formal Terms of Reference (ToR) provided to EDS by the Proponent. The consultant, instead, relied on the requirements of the Environmental Management Act (No. 7 of 2007) (EMA) and its Environmental Impact Assessment (EIA) Regulations (GN. No. 30 of 2012) to conduct the study.

The application for the ECC renewal was compiled and submitted to the MEFT. The date stamped copy of the ECC application by MEFT will be attached as Appendix A. Upon submission of an Environmental Scoping Assessment (ESA) Report and Draft Environmental Management Plan (EMP), a renewal of the ECC for the proposed project will be considered by the Environmental Commissioner at the MEFT's Department of Environmental Affairs and Forestry (DEAF).

1.3 Appointed Environmental Assessment Practitioner

To satisfy the requirements of the EMA and its 2012 EIA Regulations, the Proponent appointed EDS to conduct the required EA process on their behalf. The findings of the EA process are incorporated into this report and the draft EMP – **(Appendix B)**. These documents will be submitted as part of the ECC application to the Environmental Commissioner at the Department of Environmental Affairs and Forestry (DEAF), MEFT.

The EIA project is headed by Mr. Nerson Tjelos, a qualified and experienced Geoscientist and experienced EAP. The consultation process and reporting were done by Ms. Aili lipinge (Environmental Assessment Practitioner), reviewed by Ms. Rose Mtuleni (Environmental Assessment Practitioner). The CV of Mr. Tjelos is presented in **Appendix C**.

1.4 The Need for the Proposed Project

Mining contributes about 12.5% towards Namibia's Gross Domestic Product (GDP). The mining industry is one of the largest contributors to the Namibian economy; thus, it contributes to the improvement of livelihoods. In Namibia, small-scale mining activities have a great potential to enhance and contribute to the development of other sectors, and their activities can provide temporary employment, and taxes that fund social infrastructural development. The minerals sector yields foreign exchange and account for a significant portion of the GDP. Moreover, the

industry produces a trained workforce and small businesses that can serve communities and may initiate related businesses. Several associated activities that are fostered include, such as manufacturing of mining equipment, provision of engineering and environmental services and others.

The mining sector forms the vital part of some of Namibia's development plans, namely: Vision 2030, National Development Plan 5 (NDP5) and Harambee Prosperity Plans (HPPs) I and II. Thus, mining is essential to the development goals of Namibia in contributing to meeting the ever-increasing global demand for minerals, and for national prosperity. Therefore, successful activities on MCs 73632 – 73665 could lead to the mining of Semi-Precious Stones and industrial minerals, which would contribute towards achieving the goals of the national development plans.

2 PROJECT DESCRIPTION: PROPOSED MINING ACTIVITY

The description of small-scale mining activities and stages to be undertaken is presented below as well as the decommissioning of the mining activities.

2.1 Pre-development Phase

The small-scale mining phase includes reconnaissance and mapping to identify the lithostratigraphic packages. In addition, literature review, fieldwork (lithological (soil/rock) mapping and sampling) will be conducted to verify desktop work.

2.2 Operation and maintenance phase

During this phase, extraction of minerals and all associated mining activities are carried out on site. Both, invasive and non-invasive activities are expected to take place. Non-invasive activities include detailed mapping. No ground geophysical surveys are planned for the project. While invasive activities involve trenching and pitting, open pit mining.

A 10-year period of small-scale mining period is predicted. The selection of the potential mineralization model and mineral targets will be based on the local geology, trenching, and assay results of the samples collected. No explosives will be used during the operational phase.

Other aspects of the mining operations include:

2.2.1 Accessibility to Site

The MCs are accessible via the D1953 road which is connected to the B2 and C32 main road south-east of Karibib. Therefore, project related vehicles will be using these existing roads to access the MCs.

2.2.2 Material and Equipment

The input required for the mining program in terms of vehicles and equipment includes (4X4) vehicles, trucks, water tanks, excavator, shovel, chisel, rock and jack hammer, backhoe loader, mining machinery, and power generators. Machinery, equipment and vehicles will be stored at a designated area near the accommodation site, or a storage site established within the MCs area on the farm. **Figure 2** shows some of the equipment that are used for mining



Figure 2: Equipment used by the Small-scale Miners observed on site

2.2.3 Human Resources

The size and planned operations of the MCs make provision for about 210 workers.

2.2.4 Project Crew Accommodation

The small-scale miners will be accommodated at Neu-Schwaben Farm no. 148. The campsite areas are cordoned off. The camping area will host the workers.

The camp site will consist of tents, caravans and/or make-shift buildings and temporary ablution facilities. The predominant type of waste that will be generated during the mining activities, in small volumes, is domestic waste (non-hazardous).

2.2.5 Services and Infrastructure

A. Water

A total of 10,000 litres of water will be used monthly during the proposed mining works. Water will be used for drinking, ablution facilities, and suppressing the dust on the roads to the MCs and along active mining sites. Washing and cooling of equipment will also be one of the key activities for which water will be required. The water will be sourced from natural dams in the surrounding area and water may also be carted onto the MCs site. Further arrangements can be made by reaching a water supply agreement with the Karibib Town Council.

B. Power supply

Fuel Supply (for machinery and equipment): No electricity will be used for the small-scale mining activities. All the machineries that will be used are non-fuel consumption machines.

2.2.6 Waste Management

The different types of waste will be handled as follows:

- **Solid waste** – general solid waste (food waste, plastic, paper, etc.) and solid waste (used equipment components, discard/waste rock samples etc.) will be generated by the mining activities.
- **Liquid waste** – Wastewater will be transported to the nearest suitable local authority wastewater treatment facility, upon agreement with the Karibib Town Council. oil spills will be discarded to the nearest approved and appropriate waste facility.

- **Mining waste** – These are top soil and waste rocks removed to access the target materials. The access materials will be transported to Karibib Town council s dumping site

2.2.7 Health and safety

Like large scale mining activities, small-scale mining activities also pose several health hazards which could result into serious health risks such as injuries, diseases, or death. The exposure to these hazards could be aggravated by risk factors such as lack of the experience & limited knowledge, nature of work and non-compliance to health safety standards. The common hazards include physical, chemical, biological, radiological, agronomical, and behavioural hazards.

Adequate and appropriate Personal Protective Equipment (PPE) will be encouraged to every project personnel while on and working at the site. A minimum of five first aid kits will be readily available at the site to attend to potential minor injuries, while major injuries will need to be attended to further by transporting the injured to the nearest healthcare facility for treatment and necessary care.

Fire management: A minimum of basic firefighting equipment, i.e., fire extinguishers will be readily available at the working sites and campsite.

Project Site Security

Temporary storage areas for mining equipment, material and machines will be erected at selected MCs site. Security will be supplied on a 24-hour basis at the delegated storage sites to ensure that the project vehicles, machinery and equipment are not stolen or vandalized. A temporary support fence surrounding the storage site will be erected to ensure that local community and animals (livestock and wildlife) are not exposed to potential risks associated with certain project equipment and materials.

2.3 Decommissioning and Rehabilitation Phase

Once the mining activities on the MCs come to an end, the Proponent will need to put site rehabilitation measures in place. Decommissioning and rehabilitation are primarily reinforced through a decommissioning and rehabilitation plan, which consists of safety, health, environmental, and contingency aspects. Depletion of the mineral resource might force the Proponent to cease the mining program before predicted closure. Therefore, it is of best practice for the Proponent to ensure the project activities cease in an environmentally friendly manner and site is rehabilitated to its original state as far as possible

3. PROJECT ALTERNATIVES

Alternatives are defined as the “*different means of meeting the general purpose and requirements of the activity*” (EMA, 2007). This section will highlight the different ways in which the project can be undertaken and to identify the alternative that will be the most practical, but least damaging to the environment is identified.

Once the alternatives have been established, these are examined by asking the following three questions:

- What alternatives are technically and economically feasible?
- What are the environmental effects associated with the feasible alternatives?
- What is the rationale for selecting the preferred alternative?

3.1 Types of Alternatives Considered

3.1.1 The "No-go" Alternative

The “no action” alternative implies that the status quo remains, and nothing changes. Should the proposed mining activities on the MCs be discontinued, none of the potential impacts (positive or negative) identified would occur. If the proposed project is to be discontinued, the current land use for the MCs remains unchanged.

This option is considered as a comparative assessment of the environmental and socio-economic impacts of the no-action alternative is undertaken to establish what benefits might be lost if the project is not implemented. Some key losses that may never be realised if the proposed project does not go ahead include:

- Loss of foreign direct investment
- Potential job opportunities for local community members will not come to realisation
- Support from local businesses through the procurement of items such as Personal Protective Equipment (PPE), machinery parts, lubricants etc.
- Loss of potential income to local and national government through land lease fees, license lease fees, and various tax structures.
- Improved geological understanding of the site area, regarding the target commodities.

- Socio-economic benefits such as skills acquisition to local community members would not be realised.

Considering the above losses, the No Action alternative was not considered a viable option for this project, but in a case where parts of the site are considered environmentally sensitive and/or protected, one or several sections of the site may be identified as no-go zones.

3.1.2 Small-Scale Mining Location

The location intended for the mining activities depends on the physical and economic geology of the area. Therefore, finding an alternative location for the planned activities is not possible. The targeted mineralisation is area specific, i.e. mineral extraction targets are primarily determined by the geology (host rocks) and tectonic environment of the site (mineral forming mechanism).

Additionally, the national mineral resources' potential locations are mapped and categorised by the MME, and thereafter, proponents apply, as according to their interests, for licenses such as exclusive prospecting licenses, mining licenses and claims, mineral deposit retention licenses, reconnaissance licenses and exclusive reconnaissance licenses. Information on the MCs No. 73632 – 73665 (**Figure 3**) and other licenses is available on the Namibia Mining Cadastral Map at the link <https://portals.landfolio.com/namibia/>.



Figure 3 The location of MCs 73632 – 73665 on the Namibia Mining Cadastral

4. LEGAL FRAMEWORK: LEGISLATION, POLICIES AND GUIDELINES

A review of applicable and relevant Namibian legislation, policies, and guidelines to the proposed development is given in this section. This review serves to inform the project Proponent, Interested and Affected Parties, and the decision-makers at the DEAF of the requirements and expectations, as laid out in terms of these instruments, to be fulfilled to establish the mining activities.

4.1 The Environmental Management Act (No. 7 of 2007)

This EIA was carried out according to the Environmental Management Act (EMA) and its Environmental Impact Assessment (EIA) Regulations (GG No. 4878 GN No. 30).

The EMA has stipulated requirements to complete the required documentation to obtain an Environmental Clearance Certificate (ECC) for permission to undertake certain listed activities. These activities are listed under the following Regulations:

- 3.1 The construction of facilities for any process or activities which requires a license, right of other forms of authorization, and the renewal of a license, right or other form of authorization, in terms of the Minerals (Prospecting and Mining Act, 1992).
- 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.

The Environmental Impact Assessment (EIA) Regulations GN 28-30 (GG 4878) detail requirements for public consultation within a given environmental assessment process (GN 30 S21). The EIA regulations also outline the required details of a Scoping Report (GN 30 S8) and an Assessment Report (GN 30 S15).

Other legal obligations that are relevant to the proposed small-scale mining activities on MCs 73632 – 73665 are presented in **Table 1**.

Table 1: Applicable local and national standards, policies and guidelines governing the small-scale mining activities.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
<p>The Constitution of the Republic of Namibia, 1990 as amended</p>	<p>The Constitution of the Republic of Namibia (1990 as amended) addresses matters relating to environmental protection and sustainable development. Article 91(c) defines the functions of the Ombudsman to include:</p> <p>“...the duty to investigate complaints concerning the over-utilisation of living natural resources, the irrational exploitation of non-renewable resources, the degradation and destruction of ecosystems and failure to protect the beauty and character of Namibia...”</p> <p>Article 95(l) commits the state to actively promoting and maintaining the welfare of the people by adopting policies aimed at the:</p> <p>“...Natural resources situated in the soil and on the subsoil, the internal waters, in the sea, in the continental shelf, and in the exclusive economic zone are property of the State.”</p>	<p>By implementing the environmental management plan, the establishment will be in conformity to the constitution in terms of environmental management and sustainability.</p> <p>Ecological sustainability will be the main priority for the proposed development.</p>

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Nature Conservation Amendment Act, No. 3 of 2017	National Parks are established and gazetted in accordance with the Nature Conservation Ordinance, 1975 (4 of 1975), as amended. The Ordinance provides a legal framework with regards to the permission of entering a state protected area, as well as requirements for individuals damaging objects (geological, ethnological, archaeological and historical) within a protected area. Though the Ordinance does not specifically refer to mining as an activity within a protected area (PA) or recreational area (RA), it does restrict access to PA's and prohibits certain acts therein as well as the purposes for which permission to enter game parks and nature reserves may be granted.	The Proponent will be required to enhance the conservation of biodiversity and the maintenance of the ecological integrity of protected areas and other State land.
Minerals (Prospecting and Mining) Act (No. 33 of 1992)	Section 52 requires mineral license holders to enter into a written agreement with affected landowners before exercising rights conferred upon the license holder.	The Proponent should enter into a written agreement with landowners before carrying out mining activities on their land. The Proponent should carry out an assessment of the impact on the receiving environment.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
	<p>Section 52(1) mineral licence holder may not exercise his/her rights in any town or village, on or in a proclaimed road, land utilised for cultivation, within 100m of any water resource (borehole, dam, spring, drinking trough etc.) and boreholes, or no operations in municipal areas, etc.), which should individually be checked to ensure compliance.</p> <p>Section 54 requires written notice to be submitted to the Mining Commissioner if the holder of a mineral license intends to abandon the mineral license area.</p> <p>Section 68 stipulates that an application for mining claims (MCs) shall contain the particulars of the condition of, and any existing damage to, the environment in the area to which the application relates and an estimate of the effect which the proposed mining operations may have on the environment and the proposed steps to be taken to prevent or minimize any such effect.</p> <p>Section 91 requires that rehabilitation measures should be included in an application for a mineral license.</p>	<p>The Proponent should include as part of their application for the MCs, measures by which they will rehabilitate the areas where they intend to carry out mining activities.</p> <p>The Proponent may not carry out mining activities within the areas limited by Section 52 (1) of this Act.</p>

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Mine Health & Safety Regulations, 10th Draft	Makes provision for the health and safety of persons employed or otherwise present in mineral licenses area. These deal with among other matters; clothing and devices; design, use, operation, supervision and control of machinery; fencing and guards; and safety measures during repairs and maintenance.	The Proponent should comply with all these regulations with respect to their employees.
Petroleum Products and Energy Act (No. 13 of 1990) Regulations (2001)	Regulation 3(2)(b) states that “No person shall possess [sic] or store any fuel except under authority of a licence or a certificate, excluding a person who possesses or stores such fuel in a quantity of 600 litres or less in any container kept at a place outside a local authority area”	The Proponent should obtain the necessary authorisation from the MME for the storage of fuel on-site.
The Regional Councils Act (No. 22 of 1992)	This Act sets out the conditions under which Regional Councils must be elected and administer each delineated region. From a land use and project planning point of view, their duties include, as described in section 28 “to undertake the planning of the development of the region for which it has been established with a view to physical, social and economic characteristics, urbanisation patterns, natural resources, economic development potential, infrastructure, land utilisation pattern and sensitivity of the natural environment.	The relevant Regional Councils are I&APs and must be consulted during the Environmental Assessment (EA) process. The project site falls under the Erongo Regional Council; therefore, they should be consulted.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Water Act 54 of 1956	<p>The Water Resources Management Act 11 of 2013 is presently without regulations; therefore, the Water Act No 54 of 1956 is still in force:</p> <p>Prohibits the pollution of water and implements the principle that a person disposing of effluent or waste has a duty of care to prevent pollution (S3 (k)).</p> <p>Provides for control and protection of groundwater (S66 (1), (d (ii))).</p> <p>Liability of clean-up costs after closure/abandonment of an activity (S3 (l)). (l)).</p>	<p>The protection (both quality and quantity/abstraction) of water resources should be a priority.</p>
Water Resources Management Act (No 11 of 2013)	<p>The Act provides for the management, protection, development, use and conservation of water resources; and provides for the regulation and monitoring of water services and to provide for incidental matters. The objects of this Act are to:</p> <p>Ensure that the water resources of Namibia are managed, developed, used, conserved and protected in a manner consistent with, or conducive to, the fundamental principles set out in Section 66 - protection of aquifers, Subsection 1 (d) (iii) provide for preventing the contamination of the aquifer and water pollution control (Section 68).</p>	

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
National Heritage Act No. 27 of 2004	To provide 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.	The Proponent should ensure compliance with these Acts requirements. The necessary management measures and related permitting requirements must be taken. This done by the consulting with the National Heritage Council of Namibia.
The National Monuments Act (No. 28 of 1969)	The Act enables the proclamation of national monuments and protects archaeological sites.	
Soil Conservation Act (No 76 of 1969)	The Act makes provision for the prevention and control of soil erosion and the protection, improvement and conservation of soil, vegetation and water supply sources and resources, through directives declared by the Minister.	Duty of care must be applied to soil conservation and management measures must be included in the EMP.
Forestry Act (Act No. 12 of 2001)	The Act provides for the management and use of forests and forest products.	The Proponent will apply for the relevant permit under this Act if it becomes necessary.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
	<p>Section 22. (1) provides: “Unless otherwise authorised by this Act, or by a licence issued under subsection (3), no person shall on any land which is not part of a surveyed erven of a local authority area as defined in section 1 of the Local Authorities Act, 1992 (Act No. 23 of 1992) cut, destroy or remove - (a) vegetation which is on a sand dune or drifting sand or on a gully unless the cutting, destruction or removal is done for the purpose of stabilising the sand or gully; or (b) any living tree, bush or shrub growing within 100 m of a river, stream or watercourse.”</p>	
<p>Public Health Act (No. 36 of 1919)</p>	<p>Section 119 states that “no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health.”</p>	<p>The Proponent and all its employees should ensure compliance with the provisions of these legal instruments.</p>
<p>Health and Safety Regulations GN 156/1997 (GG 1617)</p>	<p>Details various requirements regarding health and safety of labourers.</p>	

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Atmospheric Pollution Prevention Ordinance (1976)	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, apart from East Caprivi, is proclaimed as a controlled area for the purposes of section 4(1) (a) of the ordinance.	The proposed project and related activities should be undertaken in such a way that they do not pollute or compromise the surrounding air quality. Mitigation measures should be put in place and implemented on site.
Hazardous Substance Ordinance, No. 14 of 1974	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.	The Proponent should handle and manage the storage and use of hazardous substances on site so that they do not harm or compromise the site environment
Road Traffic and Transport Act, No. 22 of 1999	The Act provides for the establishment of the Transportation Commission of Namibia; for the control of traffic on public roads, the licensing of drivers, the registration and licensing of vehicles, the control and regulation of road transport across Namibia's borders; and for matters incidental thereto. Should the Proponent wish to undertake activities involving road transportation or access onto existing roads, the relevant permits will be required.	Mitigation measures should be provided for, if the roads and traffic impact cannot be avoided, the relevant permits must be applied for.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Labour Act (No. 6 of 1992)	Ministry of Labour, Industrial Relations and Employment Creation is aimed at ensuring harmonious labour relations through promoting social justice, occupational health and safety and enhanced labour market services for the benefit of all Namibians. This ministry insures effective implementation of the Labour Act No. 6 of 1992.	The Proponent should ensure that the mining activities do not compromise the safety and welfare of workers.

4.2 International Policies, Principles, Standards, Treaties and Conventions

The international policies, principles, standards, treaties, and conventions applicable to the project are as listed in **Table 2** below.

Table 2: International Policies, Principles, Standards, Treaties and Convention applicable to the project

Statute	Provisions	Project Implications
Equator Principles	A financial industry benchmark for determining, assessing, and managing environmental and social risk in projects (August 2013). The Equator Principles have been developed in conjunction with the International Finance Corporation (IFC), to establish an International Standard with which companies must comply with to apply for approved funding by Equator Principles Financial Institutions (EPFIs). The Principles apply to all new	These principles are an attempt to: ‘...encourage the development of socially responsible projects, which subscribe to appropriately responsible environmental management practices with a minimum negative impact on

Statute	Provisions	Project Implications
	<p>project financings globally across all sectors.</p> <p>Principle 1: Review and Categorization</p> <p>Principle 2: Environmental and Social Assessment</p> <p>Principle 3: Applicable Environmental and Social Standards</p> <p>Principle 4: Environmental and Social Management System and Equator Principles Action Plan</p> <p>Principle 5: Stakeholder Engagement</p> <p>Principle 6: Grievance Mechanism</p> <p>Principle 7: Independent Review</p> <p>Principle 8: Covenants</p> <p>Principle 9: Independent Monitoring and Reporting</p> <p>Principle 10: Reporting and Transparency</p>	<p>project-affected ecosystems and community-based upliftment and empowering interactions.’</p>
<p>The International Finance Corporation (IFC) Performance Standards</p>	<p>The International Finance Corporation’s (IFC) Sustainability Framework articulates the Corporation’s strategic commitment to sustainable development and is an integral part of IFC’s approach to risk management. The Sustainability Framework comprises IFC’s Policy and Performance Standards on Environmental and Social Sustainability, and IFC’s Access to Information Policy. The Policy on Environmental and Social Sustainability describes IFC’s commitments, roles, and</p>	<p>The Performance Standards are directed towards clients, providing guidance on how to identify risks and impacts, and are designed to help avoid, mitigate, and manage risks and impacts as a way of doing business in a sustainable way, including stakeholder</p>

Statute	Provisions	Project Implications
	<p>responsibilities related to environmental and social sustainability.</p> <p>As of 28 October 2018, there are ten (10) Performance Standards (Performance Standards on Environmental and Social Sustainability) that the IFC requires a project Proponents to meet throughout the life of an investment. These standard requirements are briefly described below.</p> <p>Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts</p> <p>Performance Standard 2: Labour and Working Conditions</p> <p>Performance Standard 3: Resource Efficient and Pollution Prevention and Management</p> <p>Performance Standard 4: Community Health and Safety</p> <p>Performance Standard 5: Land Acquisition, Restrictions on Land Use, and Involuntary Resettlement</p> <p>Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources</p> <p>Performance Standard 7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities</p>	<p>engagement and disclosure obligations of the Client (Borrower) in relation to project-level activities. In the case of its direct investments (including project and corporate finance provided through financial intermediaries), IFC requires its clients to apply the Performance Standards to manage environmental and social risks and impacts so that development opportunities are enhanced. IFC uses the Sustainability Framework along with other strategies, policies, and initiatives to direct the business activities of the Corporation to achieve its overall development objectives.</p>

Statute	Provisions	Project Implications
	<p>Performance Standard 8: Cultural Heritage</p> <p>Performance Standard 9: Financial Intermediaries (FIs)</p> <p>Performance Standard 10: Stakeholder Engagement and Information</p> <p>A full description of the IFC Standards can be obtained from</p> <p>http://www.worldbank.org/en/projects-operations/environmental-and-social-framework/brief/environmental-and-social-standards?cq_ck=1522164538151#ess1</p>	
The United Nations Convention to Combat Desertification (UNCCD) 1992	<p>Addresses land degradation in arid regions with the purpose to contribute to the conservation and sustainable use of biodiversity and the mitigation of climate change.</p> <p>The convention objective is to forge a global partnership to reverse and prevent desertification/land degradation and to mitigate the effects of drought in affected areas to support poverty reduction and environmental sustainability United Nation Convention</p>	The project activities should not be such that they contribute to desertification.
Convention on Biological Diversity 1992	Regulate or manage biological resources important for the conservation of biological diversity whether within or outside protected areas, with a view to ensuring their conservation and sustainable use.	Removal of vegetation cover and destruction of natural habitats should be avoided and where not possible minimised

Statute	Provisions	Project Implications
	Promote the protection of ecosystems, natural habitats, and the maintenance of viable populations of species in natural surroundings	
Stockholm Declaration on the Human Environment, Stockholm (1972)	It recognizes the need for: “a common outlook and common principles to inspire and guide the people of the world in the preservation and enhancement of the human environment.	Protection of natural resources and prevention of any form of pollution.

Relevant international Treaties and Protocols ratified by the Namibian Government

- Convention on International Trade and Endangered Species of Wild Fauna and Flora (CITES), 1973.
- Convention on Biological Diversity, 1992.
- World Heritage Convention, 1972.

5. ENVIRONMENTAL BASELINE

Understanding the baseline (pre-project site conditions) information of a project area is crucial as it aids in undertaking a concise assessment and making of informed conclusions on the proposed project's impacts on the affected biophysical and social environment. The baseline information (conditions) of the site area and broader area that are relevant to this project area and impacts' assessment are briefly described below.

The data source used to compile this chapter ranges from the review of existing published academic papers, old and new project reports and books containing the information on the area. The information sourced from online (soft copies) and physical source research has been complemented by raw data collected on site during the site visits, assessments and public engagement meetings undertaken in September 2021.

5.1 Climate

Climate has a major influence on activities proposed for the MCs. Understanding of climatic conditions helps to determine the appropriate and/or inappropriate times to conduct these activities. Namibia is the most arid country in sub-Saharan Africa. The weather in Namibia is hot for most of the year, and the overall rainfall is low. Rainfall is very limited and extremely variable from year to year, and from place to place.

The Karibib District is characterized by daytime warm to hot temperatures throughout the year, while the nights are mild to cool in winter. The mean annual rainfall is highly variable and may range between 200 and 300 mm. The distribution of rainfall is extremely seasonal with almost all the rain falling in summer, i.e., from November to April. The area has no weather station with reliable wind data records. However, based on the regional wind patterns, prevailing wind in the area seems to be dominated by winds from the north-eastern and southwestern quadrants (Risk Based Solutions, 2020). In **Figure 4** below, different climatic conditions are shown for the proposed study area.

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature °C (°F)	24.5 °C (76.1) °F	24.4 °C (75.9) °F	24.1 °C (75.4) °F	22.9 °C (73.3) °F	20.8 °C (69) °F	17.3 °C (63.1) °F	17.1 °C (62.7) °F	19 °C (66.3) °F	22.2 °C (72) °F	24.3 °C (75.8) °F	24.6 °C (76.2) °F	24.7 °C (76.5) °F
Min. Temperature °C (°F)	18.2 °C (64.7) °F	18.6 °C (65.5) °F	18.5 °C (65.3) °F	16.6 °C (61.9) °F	13.4 °C (56.1) °F	10 °C (49.9) °F	9.7 °C (49.5) °F	10.7 °C (51.3) °F	13.4 °C (56.2) °F	16.1 °C (61) °F	17 °C (62.6) °F	17.7 °C (63.9) °F
Max. Temperature °C (°F)	32.3 °C (90.1) °F	31.5 °C (88.7) °F	30.5 °C (86.9) °F	29.3 °C (84.8) °F	27.6 °C (81.7) °F	24.9 °C (76.8) °F	24.7 °C (76.5) °F	27.5 °C (81.6) °F	31.1 °C (88.1) °F	33.2 °C (91.7) °F	33.2 °C (91.7) °F	33.1 °C (91.6) °F
Precipitation / Rainfall mm (in)	63 (2.5)	79 (3.1)	72 (2.8)	23 (0.9)	1 (0)	0 (0)	0 (0)	0 (0)	3 (0.1)	8 (0.3)	14 (0.6)	28 (1.1)
Humidity(%)	43%	47%	48%	41%	30%	29%	27%	22%	20%	23%	27%	33%
Rainy days (d)	6	7	7	3	0	0	0	0	0	2	2	3
avg. Sun hours (hours)	11.4	10.8	10.4	10.2	9.9	9.7	9.8	10.2	10.7	11.3	11.8	12.0

Figure 4: Summary of the climatic conditions for the MCs area (Sources : <https://www.worldweatheronline.com/Karibib-weather-averages/Erongo/na.aspx>)

Between the driest and wettest months, the difference in precipitation is 79 mm. The variation in temperatures throughout the year is 7.7 °C. The month with the highest relative humidity is March (48.49 %) and the month with the lowest relative humidity is September (20.16 %). March shows the highest number of rainy days is (9.70 days) whereas August has the lowest number of rainy days (0.07 days).

2.1 Topography

The Erongo Region stretches from the Central Plateau towards the west across the Central Western Plains and Escarpment to the Central Namibian coast, roughly over a distance between 200 and 350 km (Mendelsohn et al., 2003). The Mining Claims falls within the Central Plain with the elevation of 2607 m and 2639 m). Generally, the topography of the Erongo Region land rises steadily from sea level to about 100 m across the Namib Desert. The land rises steadily from sea level to about 1,000 m across the breadth of the Namib (Risk based Solutions, 2020). The Namib Desert land surface is mostly flat to undulating gravel plains, punctuated with occasional ridges and isolated 'inselberg' hills and mountains (Southern African Institute for Environmental Assessment (SAIEA), 2011).

Figure 5 (a) and **(b)** below show the landscape map, elevation model, and the elevation cross section graph, respectively.

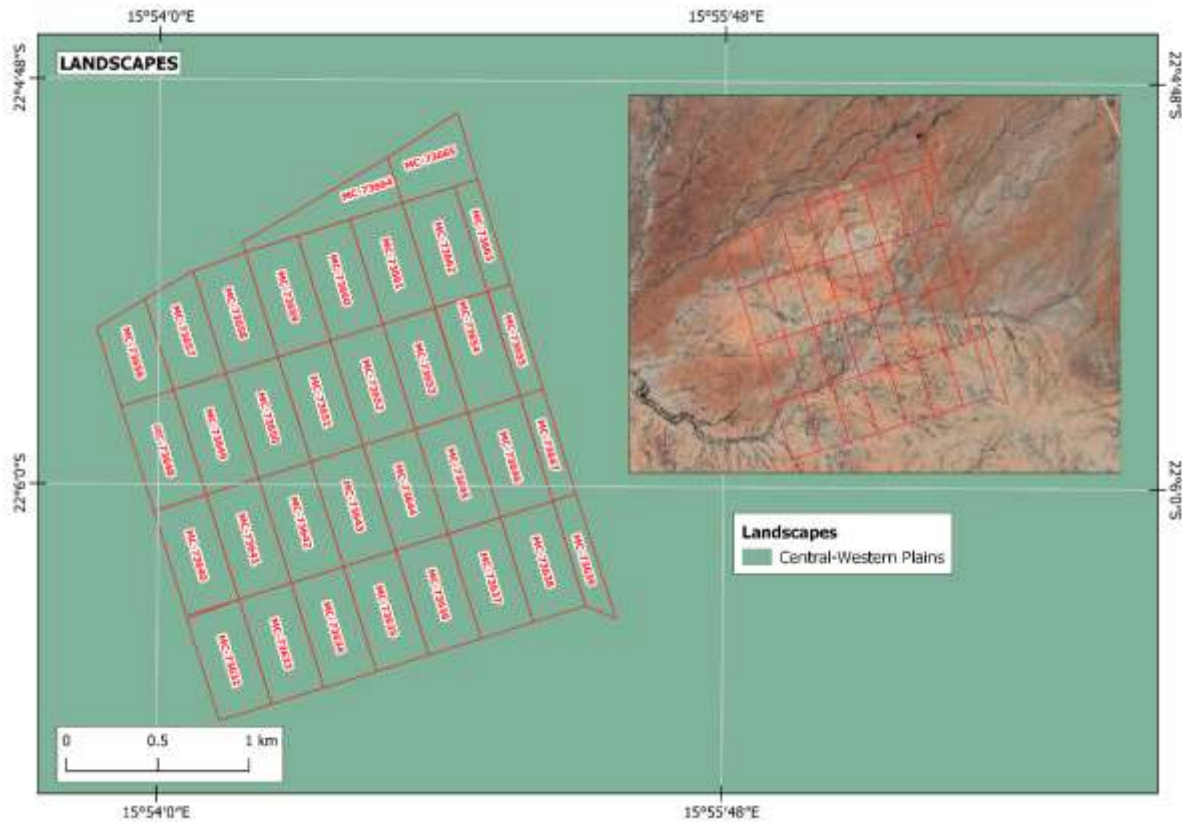


Figure 5 (a): Landscape of the project area

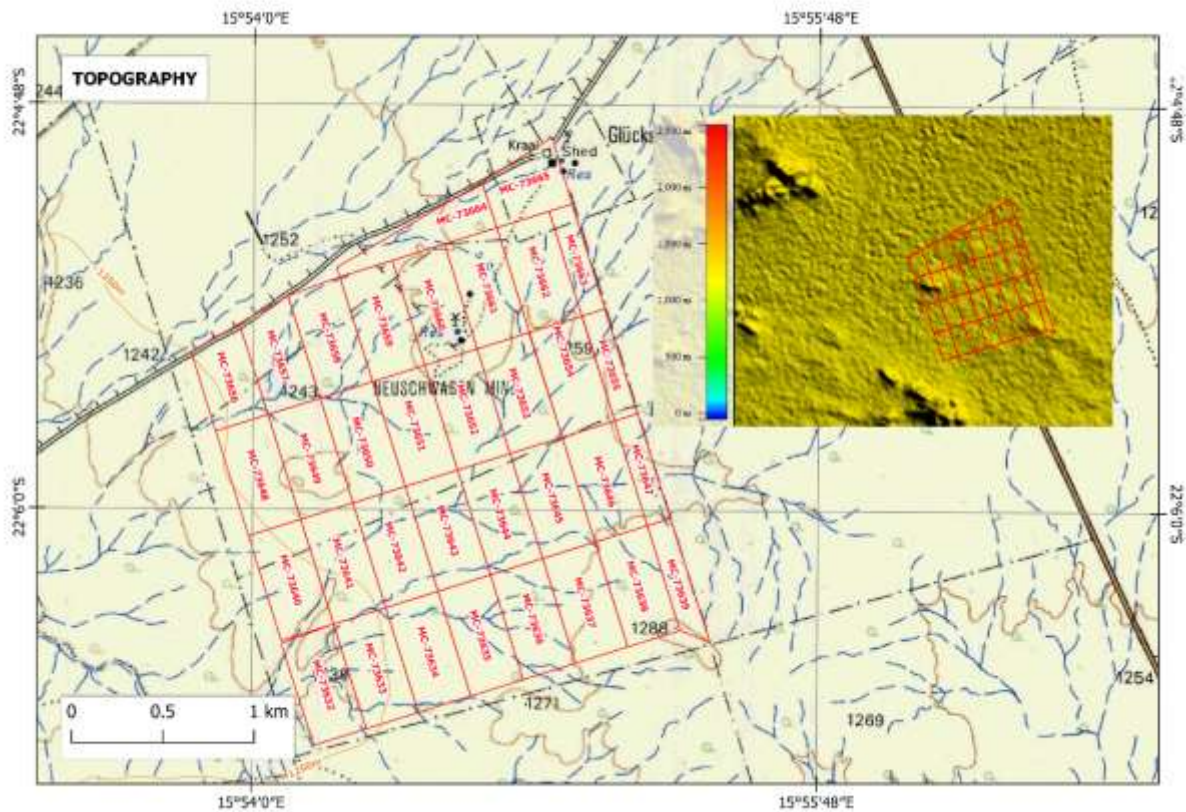


Figure 5 (b): The Topography map of MCs 73632 – 73665

5.3 Geology and Soil

The Karibib-Usakos region is situated within the Damaran belt and has been known to host a range of pegmatite occurrences (EDS, 2020). The geology of the Karibib area is characterised mainly by the Damara Supergroup and Gariep Complex rock formations, aged between 850 – 600 million years. The pegmatites range from economically important pegmatites mined for Tin, Lithium, Niobium, Tantalum, Caesium, Mica, Feldspar, Gem Tourmaline and Gem Beryl; to simple pegmatites composed of Microcline and Microcline Perthite. The pegmatites are also mined for Quartz and Albite, with some pegmatites locally containing large quantities of Muscovite, Schorl, and/or Almandine (EDS, 2020). The Karibib area is geologically made up of the Swakop Group and the Damara Granites (Mendelsohn, 2003).

The area is situated in the centre of the Damara trough. Classical geosyncline sedimentation produced a thick pile of ill-sorted sediments, which form the Ugab and Khomas subgroups of the Swakop Group (Damara Sequence). On the platform edges of the trough chiefly calcareous sediments were deposited. Both rocks suites were subsequently folded and metamorphosed, and granitic intrusion took place. Bands of marble and quartzite in these otherwise phyllitic metamorphic rocks are of hydrogeological significance. The youngest intrusive rocks in the area are complexes of post-Karoo age like Brandberg and scattered smaller outcrops (GCS Water & Environmental Consultants, 2016). The Mining claims (MCs) are dominated by Biotite Granite and Diorite Gneiss as shown in **figure 6** bellow.

The overlying Damara Sequence comprises the Nosib and Swakop Groups, consisting of various metamorphic rock types and is subdivided with decreasing age into the Etusis, Khan, Rossing, Chuos, Arandis, Karibib, Tinkas and Kuiseb formations. Typical rock types of these formations are metasediments, marbles, dolomites, calcretised silicate rocks, schists, and gneisses.

Marbles of the Karibib Formation of the Swakop Group can be found at Karibib and mountains of Triassic arkose of the Karoo Sequence, topped by hard Cretaceous basalt. Near Karibib at the southern site of the Khan River mountains by quartzite and meta-arkose of the Etusis Formation are located. From Usakos onward Swakop Group meta-sediments become increasingly intruded by granite, alkasite and pegmatites (GCS Water & Environmental Consultants, 2016).

Figure 6 shows the geology map of the area and **Figure 7** shows the typical rock structure found on the MCs site.



Figure 6: The geology of the MCs and surrounding project area



Figure 7: Typical rock structure around MCs 73632 – 73665

In terms of soil, the Karibib area is covered by the Petric Calcisol. A very small section contains some rock outcrops as well as Eutric Regosols. This soil type is characterised by their limited depth caused by the presence of a continuous hard-rock, highly calcareous or cemented layer within 100 cm of the surface (EDS, 2021). Rock fragments and exfoliation chips gather around the outcrops, where they undergo further processes of weathering. The calcareous (from limestone) soils were formed during a pluvial period when a minimum of groundwater was available. The texture of the Namib Desert soil is classified as coarse to moderately coarse.

The site area is overlain by brown loamy sand and light brown sandy gravel at different areas of the MCs. It could also be observed that the site soils are influenced by the geology (due to mechanical weathering of site rocks) and current human activities being undertaken on site (small scale mining). The common soils on some areas of the MCs (covered by grass on undisturbed areas) are shown in **Figures 8 and 9** shows the dominant soil within the project area.

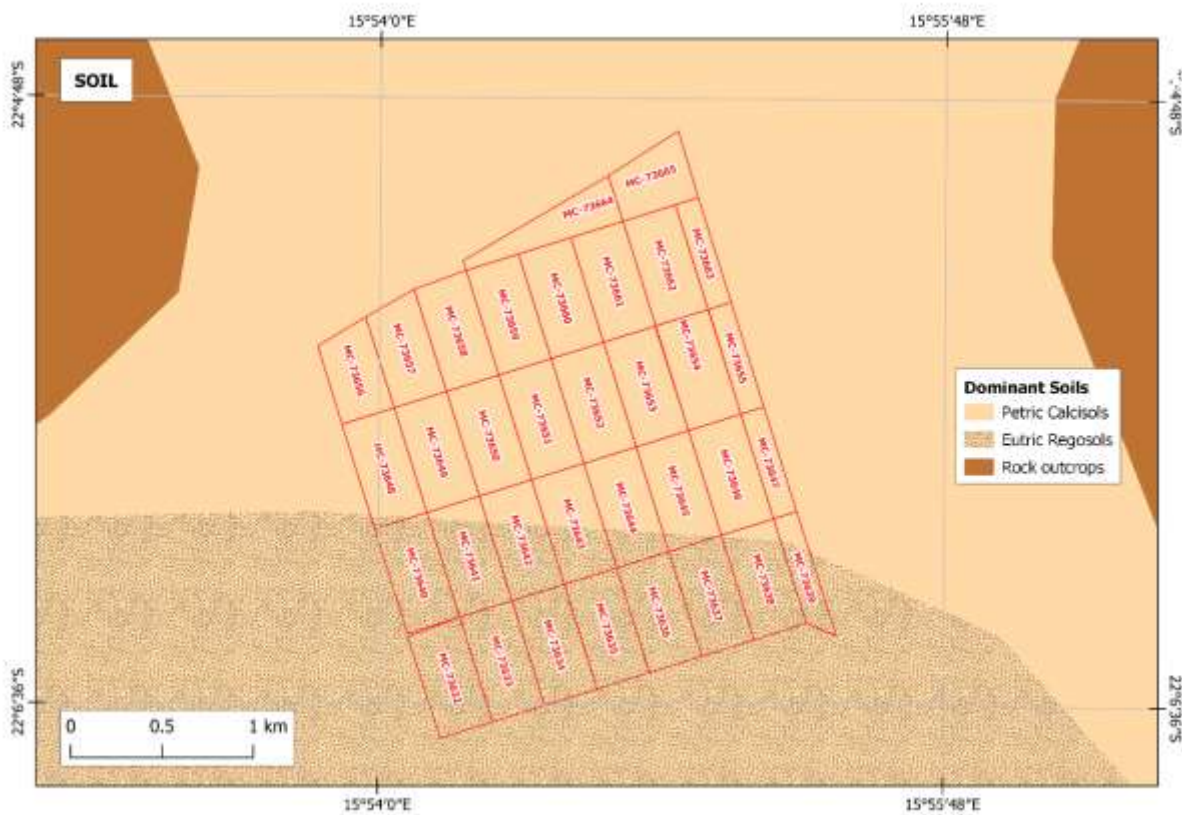


Figure 8: Dominant soil types found within the area of the MCs 73632 – 73665



Figure 9: Typical soil types found within the MCs' area

5.4 Water Resources: Hydrology and Groundwater

The town of Karibib and a large part of the Erongo Region falls within the Erongo water basin. The Erongo basin has two important water catchment areas: The Omaruru and Swakop catchment areas and Karibib and its surrounding falls within the Swakop catchment area. The three major ephemeral rivers of the Omaruru, Ugab, the Khan and the Swakop Rivers in the two catchment areas only flow in high rainy seasons for a short duration. The surface water system in the Erongo Region is therefore characterized by these ephemeral rivers. The rivers run through from their inland catchments to seawards direction. The surface flows of these ephemeral rivers are short-lived and only their alluvial aquifers provide a source of groundwater. The paleo channels in the Omaruru River form the underground Omaruru delta also provides a significant source of surface water for the central Namib (Risk Based Solutions, 2020). **Figure 10** shows the hydrology and groundwater map of the project area and **Figure 11** shows the water sources observed on the site.

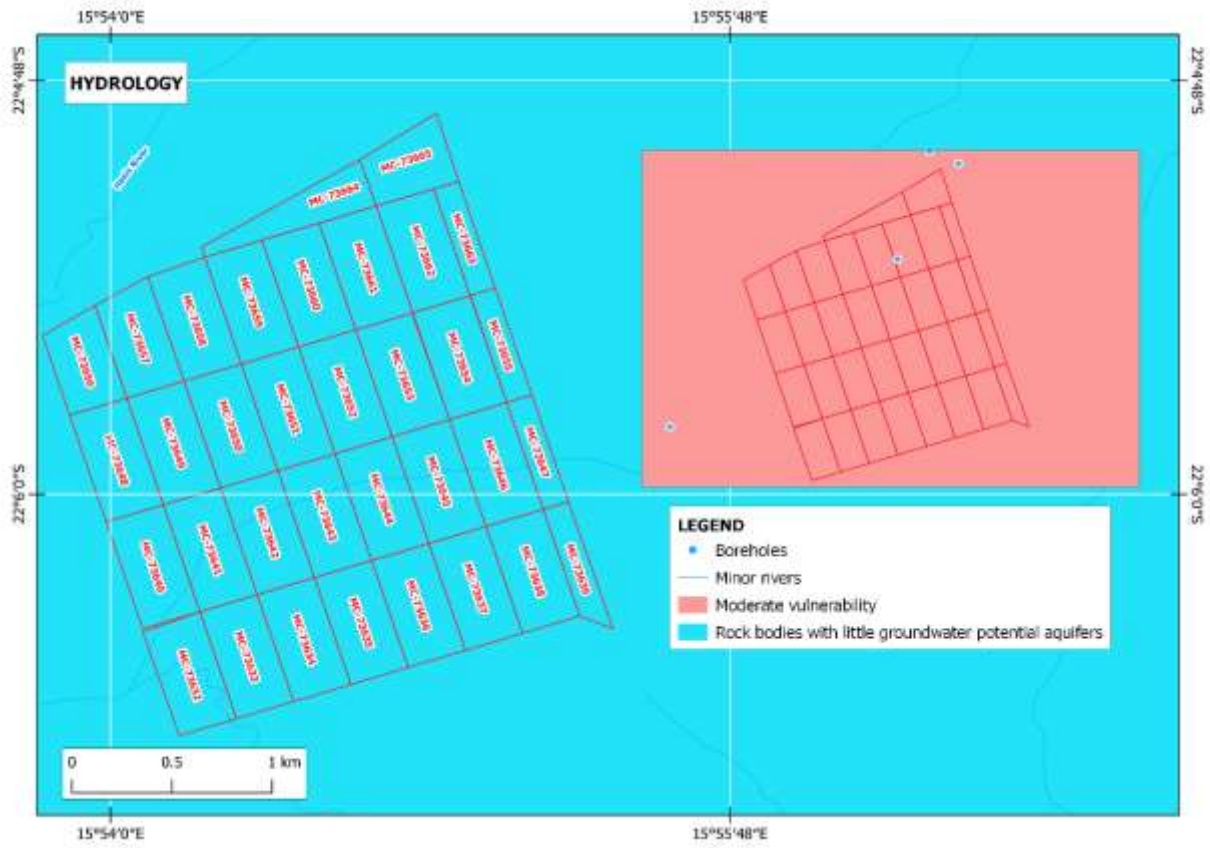


Figure 10: The hydrology and groundwater map of the project area



Figure 11: Actual groundwater (left) and an abandoned borehole (right) at the Neu-Schwaben farm

The MCs lies in an area of medium to high level of sensitivity to groundwater drought as shown in **Figure 12**.

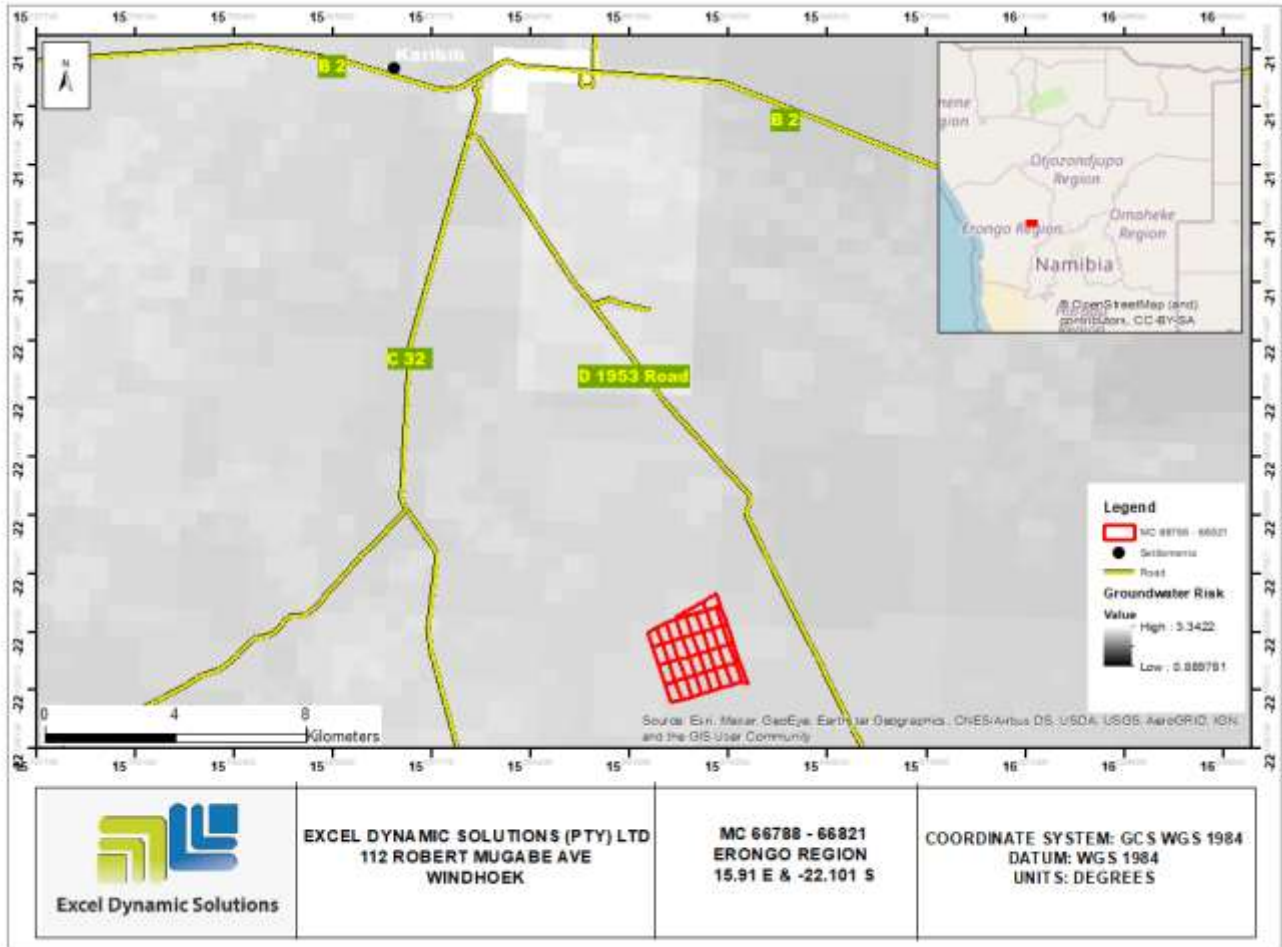


Figure 12: Groundwater Drought Risk map around the project area

Groundwater in fractured aquifers between the coast and 20-150 km inland is mostly saline. The regional groundwater of the Karibib District has a pH range of 6.6 to 8.1, i.e., is near-neutral and of similar salinity to that of Navachab (pH 6.5-7.1) (Christelis and Struckmeier, 2011). The electrical conductivity (EC) of Navachab groundwater ranges from 1.02 to 4.10 mS/cm and the water is classified as Ca/Na-Cl/SO₄ type. The Navachab and Karibib groundwater is of ‘near neutral, low metal type’. The neutral pH of the groundwater can be explained by the presence of carbonate rocks (such as marbles, limestones, and dolomites) in the area that neutralize possible acidic conditions in the water (Steven and Badenhorst, 2006).

According to Steven and Badenhorst (2006), the regional groundwater of the Karibib District has a pH range of 6.6 to 8.1, i.e., is near-neutral and of similar salinity to that of Navachab (pH 6.5-7.1).

The groundwater quality of Karibib area is classified based on the total dissolved solids (TDS). The Karibib groundwater is classified as Group A and Group B water. Group A is excellent quality water and good for human consumption and Group B is good quality water and suitable for human consumption.

There is no groundwater quality database for the project site area. However, the general groundwater quality data for the Karibib District has been obtained from the groundwater quality map of Namibia (derived from the hydrogeological map – see **Figure 13**) and Okatji Marble Mine water quality analysis. Based on the drinking water quality standards classification, the Okatji Marble water quality, the analyzed two water samples are well within the Namibian drinking water quality standards (under Group B) acceptable limits.

The water quality from the Neu Schwaben borehole was not sampled for analysis, but according to the community's complaints of the water quality, the water is light brown in color and is indeed slightly salty. The water is pumped directly from the borehole for consumption without any treatment and used by the residents for drinking, domestic uses, and livestock watering.

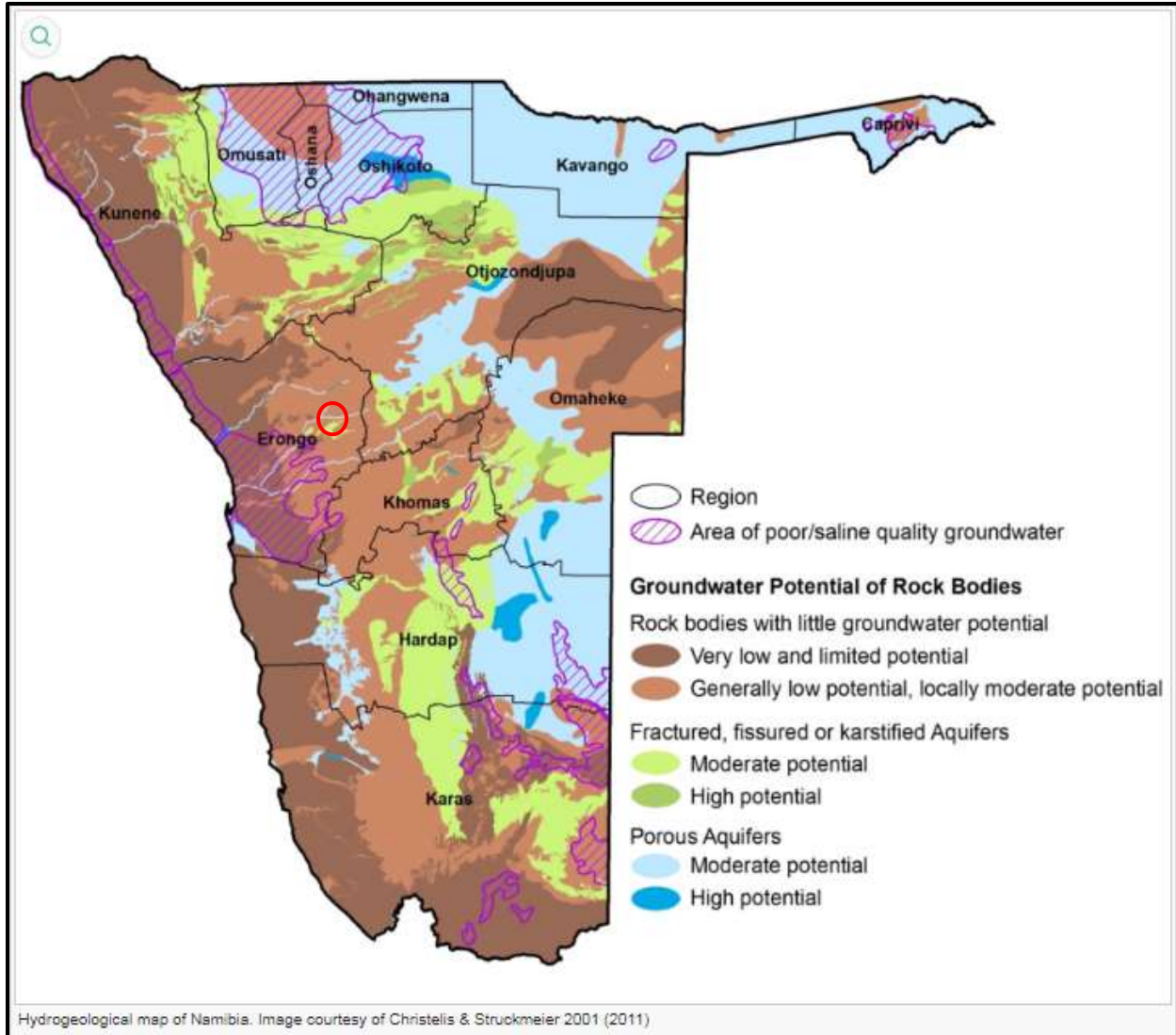


Figure 13: Hydrogeological map of Namibia with rock bodies’ groundwater potential with the approximate location of project site enclosed by the red circle

5.5 Fauna and Flora

5.5.1 Fauna

Mammals

According to Risk-Based Solutions (2020), of the at least 88 species of mammals known and/or expected to occur in the general Karibib area, 9 species (10.3%) are classified as endemic. Rodents (of which 6 species – 23.1%) and bats) of which 1 species is classified as “rare” are the

groups least studied. Risk-Based Solutions (2020) further indicated that species of greatest concern in the general area are those viewed as “rare” in Namibia -i.e., Namibian wing-gland bat and Southern African hedgehog and species classified as “near threatened” – i.e., Commerson’s roundleaf bat, striped leaf-nosed bat, and brown hyena, leopard are considered as ‘vulnerable’ by the IUCN in 2016.

During the site visit to Neu-Schwaben, none of these mentioned species were observed. According to the information provided by the workers and residents of the area, there is wildlife on the Farm. Some of the wildlife include springboks, kudus, zebras and baboons.

There are some domestic animals (goats, sheep, and cattle) on the Farm that belong to the workers.

Reptiles and Amphibians

The high percentage of endemic reptile species (45%) associated with the rocky escarpment region of central western Namibia underscores the importance of this area without formal state protection. The most important species expected to occur in the general area are viewed as tortoises *Stigmochelys pardalis* and *Psammobates oculiferus*; pythons – *P. anchietae* and *P. natalensi*). Reptiles that are considered “rare” are *Rhinotyphlops lalandei*, *Mehelya vemayi* and *Afroedura Africana*, although very little is known about them (Risk-Based Solutions, 2019).

With regards to amphibians, according to Risk-Based Solutions (2020), species such as (*Poyntonophrynus hoeschi* and *Phrynomantis annectens*) are endemic are found within the area. . Species such as *Pxicephalus adspersus* is classified as “near threatened” (), i.e., high level (42.9%) of amphibians of conservation value from the general area. Apart from these important species and because there is no open permanent surface water in the area, amphibians are not viewed as very important in the broader area.

Similarly, to reptiles, there were no amphibians observed on site due to the dryness of the area (the site visit was not done during a rainy season) and absence of prominent surface water bodies in the area.

Avifauna (Birds)

According to Risk-Based Solutions (2020), at least 217 bird species occur and/or could occur in the general Karibib area at any time. This includes 12 of the 14 Namibian endemics (85.7% of all Namibian endemic species or 5.6% of all the species expected to occur in the area). The endemic classified from the general area are the most important bird species, and these include Damara

hornbill and Herero chat. These are viewed as the most important due to the overall lack of knowledge of these species.

Other species of concern are those classified as endangered (violet wood-hoopoe, Ludwig's bustard, white-backed vulture, black harrier, tawny eagle, booted eagle, martial eagle, black stork). Vulnerable species include lappet-faced vulture, secretary bird) and near threatened species include *Ruppel's parrot*, *kori bustard*, *Verreaux's eagle*, *peregrine falcon*, and *marabou stork* (Risk-Based Solutions, 2020).

5.5.2 Flora

As the MCs falls within the Ugab, Swakop and Kuiseb Rivers area. Such area is dominated by species such as *Acacia reficiens*, *Acacia erioloba*, *Faidherbia albida*, *Tamarix usneoides* and *Euclea pseudebenus*.

The MCs have a low to medium density cover. Several vegetation also includes various grasses, shrubs and herbs, as well as invasive aliens are found within the MCs. Common vegetation found on and around the site are; young camelthorn trees and shrubs of both camelthorn and bitter bush. According to the National Botanical Research Institute (NBRI), *Commiphora* sp., which is an endemic species and the *Euphorbia chamaesycoides*, which is a near threatened status (IUCN2), also fall within this area. **Figure 14** shows the vegetation map of the project area and **Figure 15** shows the general vegetation's that were observed during the site visits.

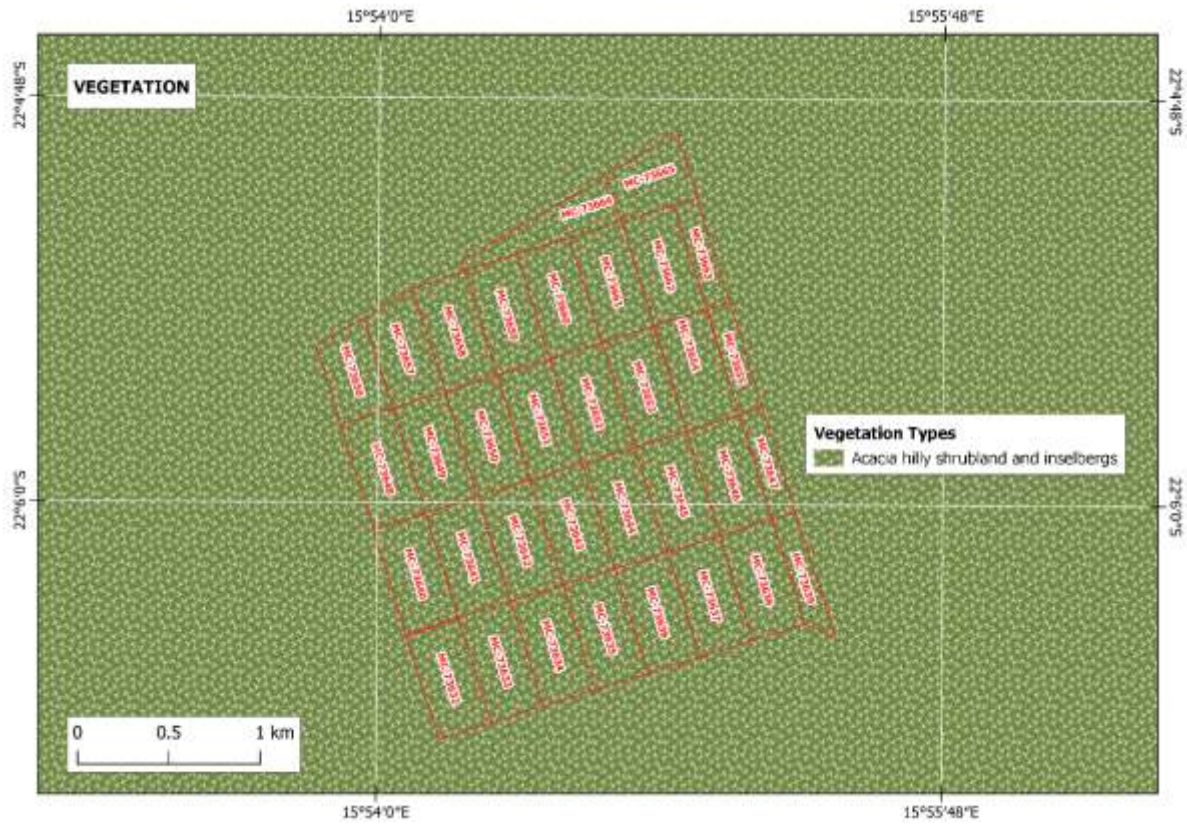


Figure 14: Dominant vegetation within MCs 73632 – 73665



Figure 15: General vegetation within the MCs' vicinity

As part of the vegetation identification, additional species information was requested from and provided by the National Botanical Research Institute (NBRI). See below the list of species of significance (near endemic, endemic, protected, etc.) found within the MCS area. It should be

noted that this is not the only species that are found within the MCs area. See attached the list of the listed species but also not limited to these species only, in **Appendix I**.

Table 3: List of vegetation species of significance found within MCs 73632 – 73665

Species	Near Endemic	Endemic	Protected	IUCN 1	IUCN 2
<i>Petalidium variabile</i> (Engl.) C.B.Clarke var. <i>variabile</i>					
<i>Merremia bipinnatipartita</i> (Engl.) Hallier f.					
<i>Agelanthus discolor</i> (Schinz) Balle					
<i>Eragrostis scopelophila</i> Pilg.					
<i>Kohautia azurea</i> (Dinter & K.Krause) Bremek.					
<i>Chamaegigas intrepidus</i> Dinter ex Heil					
<i>Salsola swakopmundi</i> Botsch.					
<i>Felicia smaragdina</i> (S.Moore) Merxm.					

<i>Osteospermum montanum Klatt</i>					
<i>Pentatrachia petrosa Klatt ex Range</i>					
<i>Pteronia lucilioides DC.</i>					
<i>Monsonia umbellata Harv.</i>					

5.6 Archaeology and Heritage

5.6.1 Regional Level

Mining Claims (MCs) No. 73632 – 73665 are located about 19 km south of Karibib in Erongo region. Archaeologically, the Mining Claims are situated within the cultural landscape which also comprises the entire Namib Desert in this landscape. To a great extent, Namibia has an archaeological sequence spanning for the most part of the last one million years. This evidence is of both regional and global significance as it is crucial to our understanding of several key developments in human history and evolution, including the early spread of ancestral humans and their adaptation to extremely arid climatic conditions, the relatively complete sequence covering the mid-Pleistocene to Recent Holocene period, represented by thousands of archaeological sites mainly concentrated in the central highlands, escarpment, and Namib Desert. Abundant evidence has been found of human occupation since at least the mid- Pleistocene (Shackley, 1985). These range from early Pleistocene (ESA-Early Stone Age) sites and mid-Pleistocene (MSA-Middle Stone Age) sites, generally surface scatters of stone artefact debris; Holocene (LSA-Later Stone Age) sites, often including natural shelters/caves with rock art, recent pastoral, farming and metal working sites. The geospatial data on the distribution of archaeological sites shows that sites are concentrated mainly in the central highlands, escarpment, and Namib Desert in the Erongo Region.

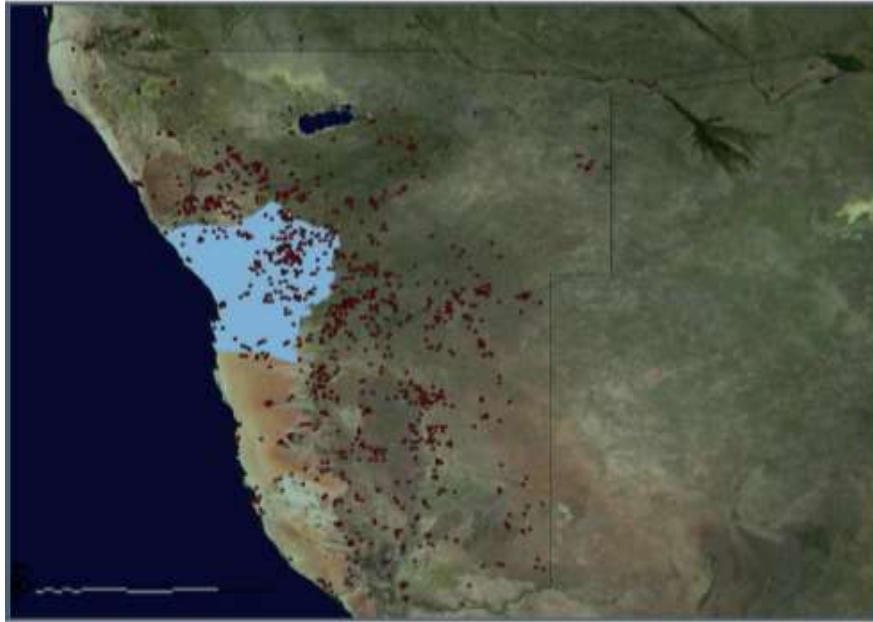


Figure 16 :Distribution of the archaeological sites in Namibia with focus on Erongo Region. Source: (Kinahan, J. 2012).



Figure 17: Historical cave (top) and abandoned house (bottom) within the MCs area

5.7 Surrounding Land Uses

The MCs 73632 – 73665 are all located within the Neu-Schwaben farm No. 148 as shown in **Figure 17**, below.

The Proponent is required to secure a signed agreement from the affected landowners and farmers to gain access to the areas of interest for prospecting and mining investigations as per the Section 52 of the Minerals (Prospecting and Mining) Act No. 33 of 1992 and Section 2.2.3 of the Minerals Policy of Namibia.

1. *Section 52 (1) The holder of mineral licence shall not exercise any rights conferred upon such holder by this Act or under any terms and conditions of such mineral licence –*

(a) In, on or under any and until such time as such holder has entered into an agreement in writing with the owner of such land containing terms and conditions relating to the payment of compensation, or the owner of such land has in writing waked any right to such compensation and has submitted a copy of such agreement or waiver to the Commissioner.

Section 2.2.3 of the Draft Minerals Policy of Namibia states that the Licence Holder and/or mineral explorers currently must negotiate a contract with landowners to gain access for or mining purposes.

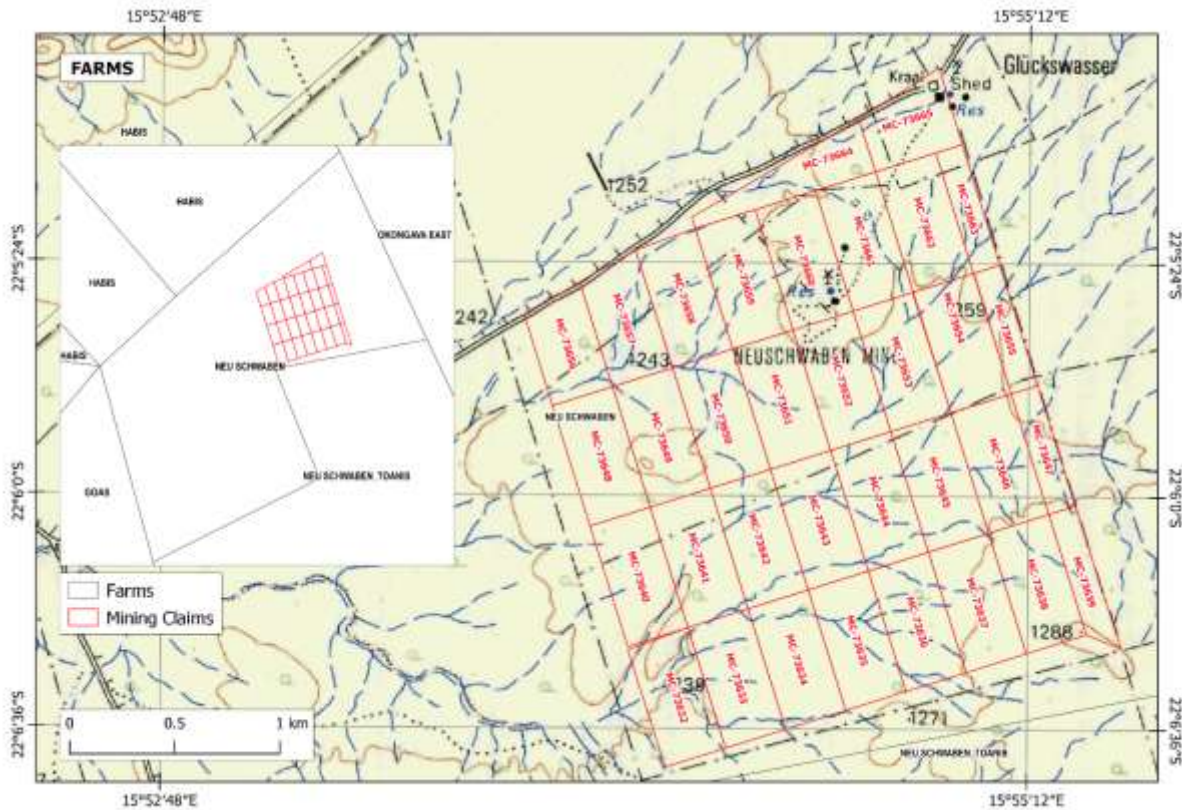


Figure 18: Land use within the MCs area

5.8 Socio-Economic conditions

The Coastal Zone of the Erongo Region is predominantly urban, because of the unique character of the landscape, which precludes agriculture. The population is thus concentrated in the urban areas of Walvis Bay, Swakopmund, Arandis and Henties Bay and a few small settlements such as Langstrand and Wlotzkasbaken. The rural population in the coastal area includes a group of Topnaars residing along the Kuiseb River (Bender, 1999).

The economy of the Erongo Region mainly depends on mining, fishing, agriculture, and tourism. The Mining Sector in the Erongo Region has been characterized by the establishment and expansion of several Uranium mines over the past decade due to an increased demand for this energy source. The Erongo Region also accommodates the mining of commodities such as gold, marble, granite, salt, and semi-precious stones (Erongo Regional Council, 2015).

The main source of income in households in the Erongo Region comes from farming (3%), wages and salaries (73%), cash remittance (5%), business and non-farming (9%) and pension (8%) (Namibia Statistics Agency, 2011a).

5.8.1 Demography

According to statistics of the last national census conducted in 2011, the population of Erongo Region is 150 809 (approximately 70 986 females and 79 823 males), whereby the population for Karibib is 5 132. The population density for the Erongo Region recorded at 2.4 persons per square kilometer (Namibia Statistics Agency, 2021).

5.8.2 Mining

These mining claims are bordering with MC 7008 on Farm Habis No. 71, where mining activities for marble were carried out. Marble is a common commodity for mining around the Karibib area, together with other commodities, mainly semi-precious stones and precious metals.

5.8.3 Infrastructure and Services

Roads: The Erongo Region is connected to the rest of the country by the B1 and B2 main roads. The project site area is accessible from Karibib by C32 and then via the D1953 gravel road.

Electricity: The regional power is supplied and distributed by the Erongo Regional Electrical Distributor (ErongoRed), combining the electricity distribution departments of the Local Authorities, Regional Councils and NamPower.

The project site is in a rural set up where some farms may be connected to the Regional power grid, whereas some may be relying on other sources of energy like domestic solar, generators and even firewood.

Water: The Erongo Regional water is supplied in bulk to industries, municipalities by NamWater (the bulk water supplier). NamWater abstracts water from the large Kuiseb River and Omaruru delta (model) aquifers, which is then pumped to several reservoirs that provide water to towns in the Region such as Walvis Bay, Swakopmund, Henties Bay, Arandis, Karibib and the mining industry.

Water in the rural areas is either supplied by the Directorate of Rural Water Supply or through privately owned boreholes on farms.

Health and Educational Facilities: There is a health facility (clinic) in Karibib as well as primary and secondary schools that cater for the Karibib constituency and other citizens.

6. PUBLIC CONSULTATION PROCESS

Public consultation forms an important component of an Environmental Assessment (EA) process. It provides potential Interested and Affected Parties (I&APs) with an opportunity to comment on and raise any issues relevant to the project for consideration as part of the assessment process, thus assisting the Environmental Assessment Practitioner (EAP) in identifying all potential impacts and to what extent further investigations are necessary. Public consultation can also aid in the process of identifying possible mitigation measures. Public consultation for this project has been done under the EMA and its EIA Regulations.

6.1 Pre-identified and Registered Interested and Affected Parties (I&APs)

Relevant and applicable national, regional, and local authorities, local leaders, and other interested members of the public were identified. Pre-identified I&APs were contacted directly, while other parties who contacted the Consultant after project advertisement notices in the newspapers, were registered as I&APs upon their request. Newspaper advertisements of the proposed mining activities were placed in two widely read national newspapers in the region (*The Namibian* Newspaper and *New Era* Newspaper). The project advertisement/announcement ran for two consecutive weeks inviting members of the public to register as I&APs and submit their comments. The summary of pre-identified and registered I&APs is listed in **Table 4** below and the complete list of I&APs is provided in **Appendix D**.

Table 4: Summary of Interested and Affected Parties (I&APs)

National (Ministries and State-Owned Enterprises)
Ministry of Environment, Forestry & Tourism, Ministry of Mines & Energy, Ministry of Agriculture, Water & Land Reform, Ministry of Works & Transport, The National Heritage Council of Namibia
Regional, and Local Authorities

Erongo Regional Council
Karibib Town Council
Karibib Constituency Office
General Public
Neu-Schwaben Independent Miners Association (NIMA)
Interested members of the public

6.2 Communication with I&APs

Regulation 21 of the EIA Regulations details the steps to be taken during a public consultation process and these have been used in guiding this process. Communication with I&APs with regards to the proposed development was facilitated through the following means and in this order:

- A Background Information Document (BID) containing brief information about the proposed facility was compiled (**Appendix E**) and hand delivered to relevant Authoritative Ministries, and upon request to all new registered Interested and Affected parties (I&APs)
- Project Environmental Assessment notices were published in *The Namibian* and *New Era* newspapers dated **21 September 2021** and **28 September 2021 (Appendix F)**, briefly explaining the activity and its locality, inviting members of the public to register as I&APs and submit their comments/concerns.
- A consultation meeting was scheduled and held with the affected farmers (landowners) on the **23rd of October, 2021** at the Neu-Schwaben Farm at 09H30 as shown in **Figure 19**. The consultation meeting minutes were taken and are attached as **Appendix G**.



Figure 19: Site notice placed at the entrance board of Neu-Schwaben by the Chief



Figure 20: Public meeting at Neu-Schwaben Farm with some of the community members and SSM workers

6.3 Feedback from Interested and Affected Parties

Issues were raised and questions asked by I&APs (from the consultation meeting) and these issues have been recorded and incorporated in the ESA Report and EMP. The summary of these key issues are presented in **Table 5** below. The meeting minutes are also attached under **Appendix H**.

Table 5: Summary of main issues and comments received during the public meeting

Issues	Concern
Centre for selling stones	When are they getting a building to sell the precious stones that we are mining?
Assisting SSM	Can they be taken through until they achieve something?

Health and Safety Training	Who will be attending the training and where will the training be held?
----------------------------	---

7 IMPACT IDENTIFICATION, ASSESSMENT AND MITIGATION MEASURES

7.1 Impact Identification

Proposed developments/activities are usually associated with different potential positive and/or negative impacts. For an environmental assessment, the focus is placed mainly on the negative impacts. This is done to ensure that these impacts are addressed by providing adequate mitigation measures such that an impact's significance is brought under control, while maximizing the positive impacts of the project activities. The potential positive and negative impacts that have been identified from the small-scale mining activities are listed as follow:

Positive impacts:

- Socio-economic development through employment creation (primary, secondary, and tertiary employment) and skills transfer,
- Open other investment opportunities and infrastructure-related development benefits,
- Produce a trained workforce and small businesses that can service communities and may initiate related businesses,
- Boosting the local economic growth and regional economic development.
- Increased support for local businesses through the procurement of consumable items such as Personal Protective Equipment (PPE), machinery spare parts, lubricants, etc.

Negative impacts:

- Potential disturbance of grazing land areas,
- Physical land / soil disturbance
- Impact on local biodiversity (fauna and flora) and habitat disturbance and potential illegal wildlife hunting (poaching) in the area.
- Potential impact on water resources and soils particularly due to pollution,
- Air quality issue: potential dust generated from the project.

- Potential occupational health and safety risks
- Vehicular traffic safety and impact on services infrastructure such as local roads
- Vibrations and noise associated with excavation activities may be a nuisance to locals
- Environmental pollution (solid waste and wastewater)
- Archaeological and heritage resources impact
- Potential social nuisance and conflicts (theft, damage to properties, etc).

7.2 Impact Assessment Methodology

The Environmental Assessment process primarily ensures that potential impacts that may occur from project activity are identified and addressed with environmentally cautious approaches and legal compliance. The impact assessment method used for this project is in accordance with Namibia's Environmental Management Act (No. 7 of 2007) and its Regulations of 2012, as well as the International Finance Corporation (IFC) Performance Standards.

The identified impacts were assessed in terms of scale/extent (spatial scale), duration (temporal scale), magnitude (severity) and probability (likelihood of occurring), as presented in **Table 7**, **Table 8**, **Table 9** and **Table 9**, respectively.

To enable a scientific approach to the determination of the environmental significance, a numerical value is linked to each rating scale. This methodology ensures uniformity and that potential impacts can be addressed in a standard manner so that a wide range of impacts are comparable. It is assumed that an assessment of the significance of a potential impact is a good indicator of the risk associated with such an impact. The following process will be applied to each potential impact:

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

The recommended mitigation measures prescribed for each of the potential impacts contribute towards the attainment of environmentally sustainable operational conditions of the project for various features of the biophysical and social environment. The following criteria were applied in this impact assessment:

7.2.1 Extent (spatial scale)

Extent is an indication of the physical and spatial scale of the impact. **Table 6** shows rating of impact in terms of extent of spatial scale.

Table 6: Extent or spatial impact rating

Low (1)	Low/Medium (2)	Medium (3)	Medium/High (4)	High (5)
Impact is localized within the site boundary: Site only	Impact is beyond the site boundary: Local	Impacts felt within adjacent biophysical and social environments: Regional	Impact widespread far beyond site boundary: Regional	Impact extend National or over international boundaries

7.2.2 Duration

Duration refers to the timeframe over which the impact is expected to occur, measured in relation to the lifetime of the project. **Table 7** shows the rating of impact in terms of duration.

Table 7: Duration impact rating

Low (1)	Low/Medium (2)	Medium (3)	Medium/High (4)	High (5)
Immediate mitigating measures, immediate progress	Impact is quickly reversible, short-term impacts (0-5 years)	Reversible over time; medium term (5-15 years)	Impact is long-term	Long term; beyond closure; permanent; irreversible or irretrievable commitment of resources

7.2.3 Intensity, Magnitude / severity

Intensity refers to the degree or magnitude to which the impact alters the functioning of an element of the environment. The magnitude of alteration can either be positive or negative. These ratings were also taken into consideration during the assessment of severity. **Table 8** shows the rating of impact in terms of intensity, magnitude, or severity.

Table 8: Intensity, magnitude or severity impact rating

Type of criteria	Negative				
	H- (10)	M/H- (8)	M- (6)	M/L- (4)	L- (2)
Qualitative	Very high deterioration, high quantity of deaths, injury of illness / total loss of habitat, total alteration of ecological processes, extinction of rare species	Substantial deterioration, death, illness or injury, loss of habitat / diversity or resource, severe alteration or disturbance of important processes	Moderate deterioration, discomfort, partial loss of habitat / biodiversity or resource, moderate alteration	Low deterioration, slight noticeable alteration in habitat and biodiversity. Little loss in species numbers	Minor deterioration, nuisance or irritation, minor change in species / habitat / diversity or resource, no or very little quality deterioration.

7.2.4 Probability of occurrence

Probability describes the likelihood of the impacts occurring. This determination is based on previous experience with similar projects and/or based on professional judgment. **Table 9** shows impact rating in terms of probability of occurrence.

Table 9: Probability of occurrence impact rating

Low (1)	Medium/Low (2)	Medium (3)	Medium/High (4)	High (5)
<p>Improbable; low likelihood; seldom. No known risk or vulnerability to natural or induced hazards.</p>	<p>Likely to occur from time to time. Low risk or vulnerability to natural or induced hazards</p>	<p>Possible, distinct possibility, frequent. Low to medium risk or vulnerability to natural or induced hazards.</p>	<p>Probable if mitigating measures are not implemented. Medium risk of vulnerability to natural or induced hazards.</p>	<p>Definite (regardless of preventative measures), highly likely, continuous. High risk or vulnerability to natural or induced hazards.</p>

7.2.5 Significance

Impact significance is determined through a synthesis of the above impact characteristics. The significance of the impact “without mitigation” is the main determinant of the nature and degree of mitigation required. As stated in the introduction to this section, for this assessment, the significance of the impact without prescribed mitigation actions is measured.

Once the above factors (**Table 7, Table 8, Table 9 and Table 9**) have been ranked for each potential impact, the impact significance of each is assessed using the following formula:

$$\text{SIGNIFICANCE POINTS (SP)} = (\text{MAGNITUDE} + \text{DURATION} + \text{SCALE}) \times \text{PROBABILITY}$$

The maximum value per potential impact is 100 significance points (SP). Potential impacts were rated as high, moderate or low significance, based on the following significance rating scale (**Table 10**).

Table 10: Significance rating scale

<i>Significance</i>	<i>Environmental Significance Points</i>	<i>Colour Code</i>
High (positive)	>60	H
Medium (positive)	30 to 60	M
Low (positive)	1 to 30	L

Significance	Environmental Significance Points	Colour Code
Neutral	0	N
Low (negative)	-1 to -30	L
Medium (negative)	-30 to -60	M
High (negative)	<-60	H

Positive (+) – Beneficial impact

Negative (-) – Deleterious/ adverse Impact

Neutral – Impacts are neither beneficial nor adverse

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

The assessment of the mining phases is done for pre-mitigation and post-mitigation.

The risk/impact assessment is driven by three factors:

- Source: The cause or source of the contamination.
- Pathway: The route taken by the source to reach a given receptor
- Receptor: A person, animal, plant, eco-system, property, or a controlled water source. If contamination is to cause harm or impact, it must reach a receptor.

A pollutant linkage occurs when a source, pathway and receptor exist together. Mitigation measures aim firstly, avoid risk and if the risk cannot be avoided, mitigation measures to minimize the impact are recommended. Once mitigation measures have been applied, the identified risk would reduce to lower significance (Booth, 2011).

This assessment focuses on the small-scale mining activities and the decommissioning. The potential negative impacts stemming from the proposed activities of the MCs are described,

assessed and mitigation measures provided thereof. Further mitigation measures in a form of management action plans are provided in the Draft Environmental Management Plan.

7.3 Assessment of Potential Negative (Adverse) Impacts

The significant negative impacts potentially associated with the small-scale mining activities of Semi-Precious Stones are assessed below:

7.3.1 Disturbance to the grazing areas

As an aspect of local culture, pastoral farming is vital. It serves as a livelihood for local communities because they depend greatly on livestock farming for subsistence and commercial purposes.

The effect of small-scale mining works on the land may hinder animal husbandry in the area and its surroundings. Mining works may disturb grazing pastures for local livestock, and if operational methods occur over a wider spatial extent, the project area might experience loss of its pastoral system over time. Losing grazing pastures for livestock minimizes the amounts of livestock and overall farming activity in the area, and lead to loss of livelihoods and household level income. Under the status quo, the impact can be considered of a low significance rating. With the implementation of appropriate mitigation measures, the rating will be reduced to a lower significance. The impact is assessed in **Table 11**, below.

Table 11: Assessment of the impacts of mining on grazing areas

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M: -3	M: -3	M/L: -4	M/H: 4	M: -40
Post mitigation	L/M: -2	L/M: -2	L/M: -4	L/M: 2	L: -16

Mitigations and recommendation to lower the possibility of disturbance and loss of the Pastoral system

- Any unnecessary removal or destruction of grazing land, due to mining activities should be avoided
- Vegetation found on the site, but not in the targeted mining areas should not be removed but left to preserve biodiversity and grazing land.

- Workers should refrain from driving off road and creating unnecessary tracks that may contribute to the loss of grazing land.
- Environmental awareness on the importance of the preservation of grazing land for local livestock should be provided to the workers.

7.3.2 Land Degradation and Loss of Biodiversity

Fauna: The trenching, pitting and excavation activities done for detailed mining would result in land degradation, leading to habitat loss for a diversity of flora and fauna ranging from microorganisms to large animals and vegetation. Endemic species are most severely affected since even the slightest disruption in their habitat can result in extinction or put them at high risk of being wiped out.

The presence and movement of the mining workforce and operation of project equipment and heavy vehicles would disturb not only the domestic animals (livestock) grazing at the mining sites of the MCs, but also the wildlife present on the mining farms. Not only the disturbance due to human and vehicle movements, but also potential illegal hunting (poaching) of local wildlife by project related workers. This could lead to loss or number reduction of specific faunal species which also impacts tourism in the community (for tourists who are interested in wildlife seeing when driving through the area).

Another potential activity that will impact the faunal community is the areas that are not rehabilitated and or unfenced boreholes, trenches and pits used for mining (once they are no longer in use). If these holes and pits/trenches are not fenced off or closed off by rehabilitating them, they could pose a high risk of site domestic and wild animals falling into these holes and pits, causing injuries and potentially mortalities.

Flora: According to Kanime and Kamwi (2021), the direct impacts on flora and vegetation communities will mainly occur through clearing for the mining access roads and associated infrastructure. The dust emissions from excavation may affect surrounding vegetation through the fall of dust. Some loss of vegetation is an inevitable consequence of the development. However, given the abundance of the shrubs and site-specific areas of mining on the MCs, the impact will be localized, therefore manageable.

Under the status, the impact can be of a medium significance rating. With the implementation of appropriate mitigation measures, the rating will be reduced to a low significance rating. The impact is assessed in **Table 12** below.

Table 12: Assessment of the impacts of mining on biodiversity

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M: -3	M: -3	M: -6	M/H: 4	M: -48
Post mitigation	L/M: -2	L/M: -2	L/M: -4	L/M: 2	L: -16

Mitigations and recommendation to minimize the loss of biodiversity

- The Proponent should avoid unnecessary removal of vegetation, thus promoting a balance between biodiversity and their operations.
- Vegetation found on the site, but not in the targeted mining site areas should not be removed but left to preserve biodiversity on the site.
- Shrubs or trees found along trenching, pitting, or sampling spots on sites should not be unnecessarily removed.
- Movement of vehicle and machinery should be restricted to existing roads and tracks to prevent unnecessary damage to the vegetation.
- No onsite vegetation should be cut or used for firewood related to the project's operations. The Proponent should provide firewood for his onsite camping workers from authorized firewood producer or seller.
- Even if a certain shrub or tree is found along mining sites, this does not mean that it should be removed. Therefore, care should be taken when mining without destroying the site vegetation.
- Design access roads appropriately in a manner that disturbs minimal land areas as possible.
- Vegetation clearing to be kept to a minimum. The vegetation of the site is largely low and open and therefore whole-sale vegetation clearing should only be applied where necessary and within the MCs footprint.
- Formulate and implement suitable and appropriate operational management guidelines for the cleared areas. Incorporated in the guidelines are the progressive rehabilitation measures. These should consider:
 - Workers should refrain from disturbing, killing or stealing farm animals and killing small soil and rock outcrops' species found on sites.
 - Poaching (illegal hunting) of wildlife from the area is strictly prohibited.

- Environmental awareness on the importance of biodiversity preservation should be provided to the workers.

7.3.3 Generation of Dust (Air Quality)

Dust emanating from site access roads when transporting mining equipment and supply (water) to and from site (time-to-time) may compromise the air quality in the area. Vehicular movements from heavy vehicles such as trucks would potentially create dust even though it is not always so severe. The hot and dry environment, loose and sandy nature of the substrate and low vegetation cover causes ambient fugitive dust levels. Additionally, activities carried out as part of the mining works such as excavation would contribute to the dust levels in the air. The medium significance of this impact can be reduced to a low significance rating by properly implementing mitigation measures. The impact is assessed in **Table 13** below.

Table 13: Assessment of the impacts of mining on air quality

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M: -3	M: -3	M/L: -4	M/H: 4	M: -40
Post mitigation	L - 1	L - 1	L- 2	L - 1	L - 4

Mitigations and recommendation to minimize dust

- Mining /extraction vehicles should not drive at a speed more than 40 km/h to avoid dust generation around the area.
- The Proponent should ensure that the mining schedule is limited to the given number of days of the week, and not every day. This will keep the vehicle-related dust level minimal in the area.
- Reasonable amount of water should be used on gravel roads, using regular water sprays on gravel routes and near mining sites to suppress the dust that may be emanating from certain mining areas on the mining claims.

7.3.4 Water Resources Use

Water resources is impacted by project developments/activities in two ways, namely through pollution (water quality) or over-abstraction (water quantity) or at times both.

The abstraction of more water than it can be replenished from low groundwater potential areas would negatively affect the local communities (communal and commercial farmers and livestock) that depend on the same low potential groundwater resource (aquifer).

The impact of the project activities on the resources would be dependent on the water volumes required by each project activity. Commonly mining activities use a lot of water, including dusting off. However, this depends on the type of excavation methods employed.

The mining method to be employed for this project's mining activities includes digging trenches, pits and other mining methods. The required water for mining is about 25,000 liters per month. This water will be used for mining purposes such cooling off equipment's and washing mining equipment, drinking and other domestic purposes. Given the low to medium groundwater potential of some project site areas, the Proponent may consider carting some of the water volumes from outside the area (from Karibib Town Council) and stored in industry standard water reservoirs/tanks on site. Although mining may be requiring this much water, this would also be dependent on the duration of the mining works and number of mining boreholes required to make reliable interpretation on the commodities explored for. The mining period is limited time wise, therefore, the impact will only last for the duration of the mining activities and ceases upon their completion.

Without the implementation of any mitigation measures, the impact can be rated as medium, but upon effective implementation of the recommended measures, the impact significance would be reduced to low as presented in the **Table 14** below.

Table 14: Assessment of the project impact on water resource use and availability

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	M/H - 4	L/M - 4	M/H - 4	M - 44
Post mitigation	L/M - 2	L/M - 2	L - 2	L/M - 2	L - 12

Mitigations and recommendation to manage water use

- Drinking water abstracted from boreholes or supplied by carting should be used efficiently, and recycling and re-using of water on certain site activities should be encouraged, where necessary and possible.

- The Proponent should consider carting water for mining activities from elsewhere if the existing boreholes cannot sustainable. Agreements of water supply should be made between the farmer / landowner and the Proponent.
- Water reuse/recycling methods should be implemented as far as practicable such that the water used to cool off mining equipment should be captured and used for the cleaning of project equipment, if possible.
- Water storage tanks should be inspected daily to ensure that there is no leakage, resulting in wasted water on site.
- Water conservation awareness and saving measures training should be provided to all the project workers in both phases so that they understand the importance of conserving water and therefore be held accountable.

7.3.5 Soil and Water Resources Pollution

The proposed mining activities are associated with a variety of potential pollution sources (i.e., lubricants, fuel and wastewater) that may contaminate/pollute soils and eventually groundwater and surface water. The anticipated potential source of pollution to water resources from the project activities would be hydrocarbons (oil) from project vehicles, machinery, and equipment as well as potential wastewater/effluent from mining related activities.

The spills (depending on volumes spilled on the soils) from these machinery, vehicles and equipment could infiltrate into the ground and pollute the fractured or faulted aquifers on site, and with time reach further groundwater systems in the area. However, it should be noted that the scale and extent/footprint of the activities where potential sources of pollution will be handled is relatively small. Therefore, the impact will be moderately low.

Pre-mitigation measure implementation, the impact significance is low to moderate and upon implementation, the significance will be reduced to low. The impact is assessed in **Table 15** below.

Table 15: Assessment of the project impact on soils and water resources (pollution)

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	M/H - 4	M – 6	M – 3	M - 39
Post mitigation	L - 1	L - 1	L – 2	L/M – 2	L - 8

Mitigations and recommendation to manage soil and water pollution

- Spill control preventive measures should be in place on site to management soil contamination, thus preventing and or minimizing the contamination from reaching water resources bodies. Some of the soil control preventive measures that can be implemented include:
 - Identification of oil storage and use locations on site and allocate drip trays and polluted soil removal tools suitable for that specific surface (soil or hard rock cover) on the sites.
 - Maintain equipment and fuel storage tanks to ensure that they are in good condition thus preventing leaks and spills.
 - The oil storage and use locations should be visually inspected for container or tank condition and spills.
- All project employees should be sensitized about the impacts of soil pollution and advised to follow appropriate fuel delivery and handling procedures.
- The Proponent should develop and prepare countermeasures to contain, clean up, and mitigate the effects of an oil spill. This includes keeping spill response procedures and a well-stocked cache of supplies easily accessible.
- Ensure employees receive basic Spill Prevention, Control, and Countermeasure (SPCC) Plan training and mentor new workers as they get hired.
- Project machines and equipment should be equipped with drip trays to contain possible oil spills when operated on site.
- Polluted soil should be removed immediately and put in a designate waste type container for later disposal.
- Drip trays must be readily available on this trailer and monitored to ensure that accidental fuel spills along the tank trailer path/route around the mining sites are cleaned on time (soon after the spill has happened).
- Polluted soil must be collected and transported away from the site to an approved and appropriately classified hazardous waste treatment facility.
- Washing of equipment contaminated hydrocarbons, as well as the washing and servicing of vehicles should take place at a dedicated area, where contaminants are prevented from contaminating soil or water resources.
- Toilet water should be treated using chemical portable toilets and periodically emptied out before reaching capacity and transported to a wastewater treatment facility.

7.3.6 Waste Generation

During the mining phase, domestic and general waste is produced on site. If the generated waste is not disposed of in a responsible way, land pollution may occur on the MCS or around the site. The MCs is in an area of moderate sensitivity to pollution. Improper handling, storage and disposal of hydrocarbon products and hazardous materials at the site may lead to soil and groundwater contamination, in case of spills and leakages. Therefore, the mining programme needs to have appropriate waste management for the site. To prevent these issues, biodegradable and non-biodegradable wastes must be stored in separate containers and collected regularly for disposal at a recognized landfill/dump site. Any hazardous waste that may have an impact on the animals, vegetation, water resources and the general environment should be handled cautiously. Without any mitigation measures, the general impact of waste generation has a medium significance. The impact will reduce to low significance, upon implementing the mitigation measures. The assessment of this impact is given in **Table 16**.

Table 16: Assessment of waste generation impact

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	L/M - 2	L/M - 2	M - 6	M - 3	M - 30
Post mitigation	L - 1	L - 1	L - 2	L/M - 2	L - 8

Mitigations and recommendation to waste management

- Workers should be sensitized to dispose of waste in a responsible manner and not to litter.
- After each daily works, the Proponent should ensure that there are no wastes left on the sites.
- All domestic and general operational waste produced daily should be contained onsite until such that time it will be transported to designated waste sites.
- No waste may be buried or burned on site or anywhere else.
- The mining site should be equipped with separate waste bins for hazardous and general/domestic waste.

- Sewage waste should be stored as per the portable chemical toilets supplied on site and regularly disposed of at the nearest treatment facility
- Oil spills should be taken care of by removing and treating soils affected by the spill.
- A penalty system for irresponsible disposal of waste on site and anywhere in the area should be implemented.
- Careful storage and handling of hydrocarbons on site is essential.
- Potential contaminants such as hydrocarbons and wastewater should be contained on site and disposed of in accordance with municipal wastewater discharge standards so that they do not contaminate surrounding soils and eventually groundwater.
- An emergency plan should be available for major/minor spills at the site during operation activities (with consideration of air, groundwater, soil, and surface water) and during the transportation of the product(s) to the sites.

7.3.7 Occupational Health and Safety Risks

Project personnel (workers) involved in the mining activities may be exposed to health and safety risks. These are in terms of accidental injury, owing to either minor (i.e., superficial physical injury) or major (i.e., involving heavy machinery or vehicles) accidents. The site safety of all personnel will be the Proponent's responsibility and should be adhered to as per the requirements of the Labour Act (No. 11 of 2007) and the Public Health Act (No. 36 of 1919). The heavy vehicle, equipment and fuel storage area should be properly secured to prevent any harm or injury to the Proponent's personnel or local domestic animals.

The use of heavy equipment, especially during excavation and the presence of hydrocarbons on sites may result in accidental fire outbreaks. This could pose a safety risk to the project personnel and equipment and vehicles too.

If machinery and equipment are not properly stored and packed, the safety risk may not only be a concern for project workers but residents too, especially children, given the fact that the project sites are within farms, where children reside too. This is true because, the local children may try to access the active site areas and play with dangerous materials and equipment.

The impact is probable and has a medium significance rating. However, with adequate mitigation measures, the impact rating will be reduced to low. This impact is assessed in **Table 17** below and mitigation measures provided.

Table 17: Assessment of the impacts of mining on health and safety

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	M - 3	M – 6	M/H - 4	M – 48
Post mitigation	L/M - 2	L/M - 2	L – 2	L/M - 2	L - 12

Mitigations and recommendation to minimize health and safety issues

- The Labour Act's Health and Safety Regulations should be complied with.
- The Proponent should commit to and make provision for bi-annual full medical check-up for all the workers at site to monitor the impact of project related activities on them (workers).
- As part of their induction, the project workers should be provided with an awareness training of the risks of mishandling equipment and materials on site as well as health and safety risk associated with their respective jobs.
- When working on site, employees should be properly equipped with adequate personal protective equipment (PPE) such as coveralls, gloves, safety boots, earplugs, dust masks, safety glasses, etc.
- Heavy vehicle, equipment and fuel storage site should be properly secured, and appropriate warning signage placed where visible.
- Drilled boreholes that will no longer be in use or to be used later after being drilled should be properly marked for visibility and capped/closed off.
- Ensure that after completion of mining holes and trenches, drill cuttings are put back into the hole and the holes filled and levelled, and trenches backfilled respectively.
- An emergency preparedness plan should be compiled, and all personnel appropriately trained.
- Workers should not be allowed to drink alcohol prior to and during working hours nor allowed on site when under the influence of alcohol as this may lead to mishandling of equipment which results into injuries and other health and safety risks.
- The site areas that are considered temporary risks should be equipped with "danger" or "cautionary" signs.

7.3.8 Vehicular Traffic Use and Safety

The district roads such as C39, and D2625 are the main transportation routes for all vehicular movement in the area and provide access to the MCs and connect the project area to other towns. Traffic volume will therefore increase on these district roads during mining as the project would need a delivery of supplies and services on site. These service and supplies will include but not limited to water, waste removal, procurement of mining machinery, equipment, and others.

Depending on the project needs, trucks, medium and small vehicles will be frequenting the area to and from mining sites on the MCs. This would potentially increase slow moving heavy vehicular traffic along these roads. The impact would not only be felt by the district road users but also the local road users such as farms (via local access gravel and single-track roads). This would add additional pressure on the roads.

However, only so many times a week or even monthly that the mining related heavy trucks will be transporting materials and equipment from and to site during mining. Therefore, the risk is anticipated to be short-term, not frequent, and therefore of medium significance. Pre-mitigation, the impact can be rated medium and with the implementation of mitigation measures, the significance will be low as assessed in **Table 18** below.

Table 18: Assessment of the impacts of mining on road use (vehicular traffic)

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	M/H - 4	L/M – 4	M/H - 4	M - 44
Post mitigation	L/M - 2	L/M - 2	L – 2	L/M - 2	L - 12

Mitigations and recommendation to minimize impact on road safety and related vehicular traffic issues

- The transportation of mining materials, equipment and machinery should be limited to once or twice a week only, but not every day to reduce the pressure on local roads.
- The heavy truck loads should comply with the maximum allowed speed limit for respective vehicles while transporting materials and equipment/machinery on the public and access roads (40km/h).

- The potential carted water to the site (from other source of water supply) should be done once or twice a week in container that can supply and store water for most of the week, thus reducing the number of water-carting trucks on the road daily.
- Drivers of all project phases' vehicles should be in possession of valid and appropriate driving licenses and adhere to the road safety rules.
- Drivers should drive slowly (40km/hour or less) and be on the lookout for livestock and wildlife as well as residents/travellers.
- The Proponent should ensure that the site access roads are well equipped with temporary road signs conditions to cater for vehicles travelling to and from site throughout the project's life cycle.
- Project vehicles should be in a road worthy condition and serviced regularly to avoid accidents owing to mechanical faults.
- Vehicle drivers should only make use of designated site access roads provided and as agreed.
- Vehicle's drivers should not be allowed to operate vehicles while under the influence of alcohol.
- No heavy trucks or project related vehicles should be parked outside the project site boundary or demarcated areas for such purpose.
- To control traffic movement on site, deliveries from and to site should be carefully scheduled. This should optimally be during weekdays and between the hours of 8 am and 5 pm.
- The site access road(s) should be upgraded to an unacceptable standard to be able to accommodate project related vehicles as well as farm vehicles.

7.3.9 Noise and vibrations

Mining works may be a nuisance to surrounding communities due to the noise produced by the activity. Excessive noise and vibrations can be a health risk to workers on site. The mining equipment used on site is of medium size and the noise level is bound to be limited to the site only, therefore, the impact likelihood is minimal. Without any mitigation, the impact is rated as of medium significance. To change the impact significance from the pre-mitigation significance to low rating, the mitigation measures should be implemented. This impact is assessed in **Table 19** below.

Table 19: Assessment of the impacts of noise and vibrations from mining

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	L/M - 2	L/M - 2	M – 6	M/H - 3	M – 30
Post mitigation	L - 1	L/M - 2	L – 2	L/M -2	L - 10

Mitigations and recommendation to minimize noise

- Noise from operations' vehicles and equipment on the sites should be at acceptable levels.
- The mining operational times should be set such that no mining activity is carried out during the night or very early in the mornings.
- Mining hours should be restricted to between 08h00 and 17h00 to avoid noise and vibrations generated by mining equipment and the movement of vehicles before or after hours.
- When operating the excavation machinery onsite, workers should be equipped with personal protective equipment (PPE) such as earplugs to reduce exposure to excessive noise.

7.3.10 Disturbance to Archaeological and Heritage resources

The sensitivity of the area of interest is not only basing on its landscape but surface and sub-surface archaeological materials that are not yet to discovered or located. In this regard, the most likely impact on this area will arise from the presence or absence of sub-surface archaeological objects/materials. Again, the damage can occur through encroachment, disturbance, and possible destruction during intrusive mining activities. The secondary impact would be inadvertent encroachment and disturbance due to inappropriate siting of mining camps, equipment and supply laydowns and routes of access.

Therefore, this impact can be rated as medium significance if there are no mitigation measures in place. Upon implementation of the necessary measures, the impact significance will be reduced to a lower rating. The impact is assessed in **Table 20**.

Table 20: Assessment of the impacts of mining on archaeological & heritage resources

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
-------------------	--------	----------	-----------	-------------	--------------

Pre mitigation	M - 3	M - 3	M – 6	M/H - 4	M – 48
Post mitigation	L/M - 2	L/M - 2	L – 2	L/M - 2	L - 12

Mitigations and recommendation to minimize impact on archaeological and heritage resources

- A “No-Go-Area” should be put in place where there is evidence of archaeological site, historical items or cultural objects. It can be a demarcation by fencing off or avoid the site completely by not working closely or near the known site.
- On-site personnel (s) and contractor crews must be sensitized to exercise and recognize “chance finds heritage” in the course of their work.
- During the mining works, it is important to take note and recognize any significant material being unearthed and making the correct judgment on which actions should be taken (refer to CFP Appendix attached to the EMP).
- The footprint impact of the proposed mining activities should be kept to minimal to limit the possibility of encountering chance finds within the MCs boundaries. The Proponent should keep a buffer of 50 meters on all the archaeological/cultural sites observed within the project site and broader area throughout their stay (duration of their presence) in the area.
- A landscape approach of the site management must consider culture and heritage features in the overall planning of mining infrastructures within and beyond the license boundaries.
- The Proponent and Contractors should adhere to the provisions of Section 55 of the National Heritage Act in event significant heritage and culture features are discovered while conducting mining works.
- Subject to the recommendations herein made and the implementation of the mitigation measures and adoption of the project Archaeological Management Plan (AMP)/EMP should be complied.
- An archaeologist or Heritage specialist should be onsite to monitor all significant earth moving activities that may be implemented as part of the proposed project activities.
- When the removal of topsoil and subsoil on the site for mining purposes, the site should be monitored for subsurface archaeological materials by a qualified Archaeologist.
- Show overall commitment and compliance by adapting “minimalistic or zero damage approach”.

- In addition to these recommendations above, there should be a controlled movement of the contractor, mining crews, equipment, setting up of camps and everyone else involved in the mining activities to limit the proliferation of informal pathways, gully erosion and disturbance to surface and sub-surface artifacts such as stone tools and other buried materials etc.

7.3.11 Impact on Local Roads

These types of projects are usually associated with movements of heavy trucks and equipment or machinery that use locals frequently. The heavy trucks travelling on the local roads and exert more pressure on them. These local roads in remote areas are normally not in a good condition already for light vehicles, and the additional vehicles such as heavy ones may make it worse and difficult to be used by small (vehicles) that already struggled on the roads before they got worse. This will be a concern if maintenance and care is not done during the mining phase. The impact would be short-term (during mining only) and therefore, manageable.

Without any management and or mitigation measures, the impact can be rated as medium and to reduce this rating to low, the measures will need to be effectively implemented. The assessment of this impact is presented in **Table 21**.

Table 21: Assessment of mining on local services (roads and water)

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M/H - 4	M - 3	M - 6	M - 3	M - 39
Post mitigation	L - 1	L - 1	M/L - 4	M/L -2	L - 12

Mitigations and recommendation to minimize the impact on local services

- The heavy trucks transporting materials and services to site should be scheduled to travel at least twice or thrice a week to avoid daily travelling to site, unless on cases of emergencies.
- The Proponent should consider frequent maintenance of local roads on the farms to ensure that the roads are in a good condition for other roads users such as farmers, and travelers from and outside the area.

7.3.12 Social Nuisance: Local Property intrusion and Disturbance or Damage

The presence of some non-residence workers may lead to social annoyance to the local community. This could particularly be a concern when they or some of those workers enter or damage properties of the locals. The private properties of the locals (farmers) could be houses, fences, vegetation, or domestic and wild animals (livestock and wildlife) or any properties of economic or cultural value to the farm/landowners or occupiers of the land. The damage or disturbance to properties may not only be private but local public properties. The unpermitted and unauthorized entry to private properties may cause clashes between the affected property (land) owners and the Proponent.

Pre-implementation of mitigation measures, the impact is rated as of medium significance. However, upon mitigation (post-mitigation), the significance will change from medium to low rating. The impact is assessed below (**Table 22**).

Table 22: Assessment of social impact of community property damage or disturbance

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	M - 3	M - 6	M/H - 4	M – 48
Post mitigation	L - 1	L - 1	M/L - 4	M/L -2	L - 12

Mitigations and recommendation to minimize the issue of damage to or intrusion of properties

- The Proponent should inform their workers on the importance of respecting the farmers' properties by not intruding or damaging their houses, fences or snaring and killing their livestock and wildlife.
- Any workers or site employees that will be found guilty of intruding peoples 'privately owned properties should be called in for disciplinary hearing and/or dealt with as per their employer' (Proponent)'s code of employment conduct
- The project workers should be advised to respect the community and local's private properties, values, and norms.
- No worker should be allowed to wander in people's private yards or fences without permission.

- The project workers are not allowed to kill or in any way disturb local livestock and wildlife on farms.
- The cutting down or damaging of vegetation belonging to the affected farmers or neighbouring farms is strictly prohibited.

7.3.13 Social Nuisance: Job seeking and Differing Norms, Culture and Values

The proposed project activities could attract a potential influx of people from outside the project area in search of job opportunities. Such influxes during the mining phase may lead to social annoyance to the local community as well as conflicts. This is generally considered a concern given the current unemployment rate of youth in Namibia, that people from other areas in different regions may learn of the project intentions through EIA notices in the newspapers and be forced to go look for work opportunities in the area. Different people may come with different ways of living to the area, which could interfere with the local norms, culture, and values. This could potentially lead to social crashes between the locals and outsiders (out-of-area job seekers).

Pre-implementation of mitigation measures, the impact is rated as of medium significance. However, upon mitigation (post-mitigation) – see mitigation measures below, the significance will change from medium to low rating. The impact is assessed in **Table 23** below.

Table 23: Social impact assessment of outsiders’ influx into the area (job seeking related)

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	M - 3	M - 6	M/H – 4	M – 48
Post mitigation	L/M - 2	L/M - 2	L - 2	L/M – 2	L - 12

Mitigations and recommendation measure to reduce the influx of outsiders into the area

- The Proponent should prioritize the employment of more local people, and only if necessary and due to lack of skills in the area, out-of-area people can be given some of the work. This is to avoid the influx of outsiders into the area for works that can be done the locals.
- The locals employed during mining should be provided with the necessary training of skills required for the project to avoid bringing in many out-of-area employees. This way, skills development and transfer is ensured in the local community.

- Out-of-area workers that may be employed (due to their unique work skills) on site should be sensitized on the importance of respecting the local values and norms, so that they can co-live-in harmony with the local communities during the duration of their employment period on site.

7.4 Cumulative Impacts Associated with Proposed Mining

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

Similarly, to many other mining projects, one cumulative impact to which the proposed project and associated activities potentially contribute is the:

- **Impact on road infrastructure:** The proposed mining activity contributes cumulatively to various activities such as farming activities and travelling associated with tourism and local daily routines. The contribution of the proposed project to this cumulative impact is however not considered significant given the short duration, and local extent (site-specific) of the intended mineral mining activities.
- **The use of water:** While the contribution of this project will not be significant, mitigation measures to reduce water consumption during mining are essential.

7.5 Mitigations and Recommendations for Rehabilitation

The rehabilitation of explored (disturbed) sites will include but not limited to the following:

- Backfilling of trenches and or pits
- Closing off and capping of all mining trenches and pits. The holes (opening / pits) should not only be filled with sand alone, as wind will scour the sand and re-establish the holes.
- Carrying away all waste generated from the last disposal to the last days on site.
- Transporting all machinery and equipment as well as vehicles to designated offsite storage facilities.

8 RECOMMENDATIONS AND CONCLUSIONS

8.1 Recommendations

The potential positive and negative impacts stemming from the proposed mining activities on MCs were identified, assessed and appropriate management and mitigation measures (to negative impacts) made thereof for implementation by the Proponent, their contractors and project related employees.

The public was consulted as required by the EMA and its 2012 EIA Regulations (Section 21 to 24). This was done via the two newspapers (*New Era* and *The Namibian*) used for this environmental assessment. A consultation face-to-face meeting with the interested and affected part was held whereby they raised comments and concerns on the proposed project activities.

The issues and concern raised by the registered I&APs formed the basis for this Report and the Draft EMP. The issues were addressed and incorporated into this Report whereby mitigation measures have been provided thereof to avoid and/or minimize their significance on the environmental and social components. Most of the potential impacts were found to be of medium rating significance. With the effective implementation the recommended management and mitigation measures, this will particularly see the reduction in the significance of adverse impacts that cannot be avoided completely (from medium rating to low). To maintain the desirable rating, the implementation of management and mitigation measures should be monitored by the Proponent directly, or their Environmental Control Officer (ECO) is highly recommended. The monitoring of this implementation will not only be done to maintain the impacts' rating or maintain low rating but to also ensure that all potential impacts identified in this study and other impacts that might arise during implementation are properly identified in time and addressed right away.

An Archaeological & Heritage Impact Assessment (AHIA) was done by a specialist for this ESA Study. The findings of this AHIA and the Scoping assessment (ESA) were deemed sufficient and conclude that no further detailed assessments are required to the ECC application.

The Environmental Consultant is confident that the potential negative impacts associated with the proposed project activities can be managed and mitigated by the effective implementation of the recommended management and mitigation measures and with more effort and commitment put on monitoring the implementation of these measures.

It is therefore, recommended that the proposed mining activities may be granted an Environmental Clearance Certificate, provided that:

- All the management and mitigation measures provided herein are effectively and progressively implemented.
- All required permits, licenses and approvals for the proposed activities should be obtained as required. These include permits and licenses for land use access agreements to explore and ensuring compliance with these specific legal requirements.
- The Proponent and all their project workers or contractors comply with the legal requirements governing their project and its associated activities and ensure that project permits and or approvals required to undertake specific site activities are obtained and renewed as stipulated by the issuing authorities.
- Site areas where mining activities have ceased are rehabilitated, as far as practicable, to their pre-mining state.

8.2 Conclusion

In conclusion, it is crucial for the Proponent and their contractors to effectively implementation of the recommended management and mitigation measures to protect both the biophysical and social environment throughout the project duration. All these would be done with the aim of promoting environmental sustainability while ensuring a smooth and harmonious existence and purpose of the project activities in the community and environment at large. This is to ensure that all potential impacts identified in this study and other impacts that might arise during implementation are properly identified in time and addressed accordingly. Lastly, should the ECC be issued, the Proponent will be expected to be compliant with the ECC conditions as well as legal requirements governing the mineral mining and related activities.

9 REFERENCES

1. Booth, P. (2011). Environmental Conceptual Site Model Exercise: Source – pathway – receptor. WSP Global: Semantic Scholar.
2. Bender, K. B. (1999). Coastal Profile of the Erongo Region. Windhoek: Environmental Information Service Namibia.
3. Britannica, 2022. Retrieved from: <https://www.britannica.com/science/Leptosol>
4. Christelis, G and Struckmeier, W (eds). (2011). *Groundwater in Namibia: An Explanation to the Hydrogeological Map*. Windhoek: Department of Water Affairs.
5. Erongo Regional Council. (2015). Erongo Regional Council. Retrieved from Infrastructure, Economy and Development: <http://www.erc.com.na/economy/infrastructure>
6. GCS Water & Environmental Consultants. (2016). *Okatji Marble Mine Water Use Permit Application: Technical Report*. Windhoek: Unpublished.
7. Kanime, N. and Kamwi, J. (2021). Biodiversity Assessment for the Mining of suitable rocks that can be quarried for dimension stone and industrial minerals production on Mining Claims 71609 – 71617 in the Erongo Region. Windhoek: Unpublished.
8. Mendelsohn, J. (2003). Atlas of Namibia: A Portrait of the Land and its People. Windhoek: The Ministry of Environment, Forestry and Tourism.
9. Namibia Statistics Agency. (2011). 2011 Population and Housing Census: Erongo Regional Profile 2011, Census Regional Profile. Windhoek: Namibia Statistics Agency.
10. Risk-Based Solutions. (2019). Final Environmental Impact Assessment (EIA) Report to Support the Application for the Environmental Clearance Certificate (ECC) for the Proposed Minerals Mining/Prospecting in the Exclusive Prospecting License (EPL) No. 5555, Karibib District, Erongo. Windhoek: Ministry of Environment, Forestry and Tourism.
11. Risk-Based Solutions. (2020). *Environmental Impact Assessment Report for the Mining License (ML) No. 190, Karibib District, Erongo Region, West-Central Namibia*. Windhoek: Ministry of Environment, Forestry and Tourism.
12. Southern African Institute for Environmental Assessment (SAIEA). (2011). *Strategic Environmental Assessment for the Central Namib Uranium Rush*. Windhoek: Ministry of Mines & Energy.
13. Tree atlas of Namibia. Retrieved from: <https://treeatlas.biodiversity.org.na/viewspec.php?nr=27>