



Scoping Assessment Report

Prepared to Support an Application to Amend an
Environmental Clearance Certificate (ECC) to Allow for
Exploration of Industrial Mineral Groups and Base & Rare
Metals Group on Mining Claim (MC-70725)

Karibib District, Erongo Region

August 2023

INFORMATION SHEET	
Project Title Name	<p>Scoping Assessment Report</p> <p>Prepared in Support of an Application for an Amendment of an Environmental Clearance Certificate (ECC) to Allow for Exploration of Industrial Minerals Group (IMG) and Base and Rare Metals Group (BRMG) on one Mining Claim with the Number: MC-70725</p> <p>Karibib District, Erongo Region</p>
MEFT Application No.	: APP-002312
Applicant	<p>Mr Jeano Foelscher</p> <p>Box 67</p> <p>: KARIBIB</p> <p>Erongo Region</p> <p>Namibia</p>
Report Status	: Final
Report Date	: August 2023

TABLE OF CONTENT

ABBREVIATIONS AND ACRONYMS	vi
DEFINITION OF TERMS	vii
1 PROJECT BACKGROUND.....	9
1.1 Introduction	9
1.2 The Proponent and Mining Claim Holder	9
1.3 The Mining Claim	9
1.4 Environmental Clearance Certificate	9
1.5 Appointment of EIA Consultant	9
1.6 Terms and Conditions Attached to MC-70725	11
1.7 Motivation and Rationale for Amendment.....	11
1.8 Listed activities Triggered by the Project	12
1.9 Assumption and Limitations	13
2 PROJECT DESCRIPTION.....	14
2.1 Project site and Accessibility	14
2.1.1 Existing Services.....	15
2.1.2 Water Availability.....	15
2.1.3 Electricity Resources.....	15
2.2 Mineral Acquisition	16
2.3 Search for Minerals.....	16
2.3.1 Reconnaissance Licence.....	16
2.3.2 Prospecting.....	16
2.3.3 Exploration.....	17
2.3.4 Mining Operation.....	18
2.4 Key project components	20
2.4.1 Planning and Mobilisation Phase	20
2.4.2 Provision for Support Infrastructure	20
2.4.3 Drilling Procedure	20
2.5 Potential Impacts	21
2.6 Project Alternatives	23
3 THE LEGAL FRAMEWORK	25
3.1 Specific Legal Instruments.....	25
3.2 Other Applicable Legal Instruments.....	25
3.3 International and Regional Treaties and Protocols.....	27
4 THE PROJECT BASELINE ENVIRONMENT	28
4.1 Climatic Conditions.....	28
4.1.1 Temperature.....	28
4.1.2 Rainfall.....	28
4.1.3 Wind pattern.....	29
4.1.4 Sunshine hours.....	29
4.2 Topography and Drainage.....	29
4.3 Geological Aspects and Hydrology.....	29
4.4 Soil Aspects.....	29
4.5 Land Use, Alternatives and Ownership	30
4.6 The Biodiversity	30
4.6.1 Vegetation.....	30
4.6.2 Animals.....	30
4.6.3 Mammals.....	31
4.6.4 Reptiles.....	31
4.6.5 Birds (Avifauna).....	31
4.7 The Socio-economic Environment.....	32
4.7.1 Regional Context.....	32

4.7.2	Constituency Context.....	32
5	ASSESSMENT METHODOLOGY	33
5.1	Assessment Criteria.....	33
5.2	Additional Assessment Criteria.....	35
6	IMPACT DESCRIPTION AND ASSESSMENT	36
6.1	Impacts on the Physical Environment	36
6.1.1	Climatic Change – Project related GHG Emissions to Climate Change.....	36
6.1.2	Soils and Land Disturbance - Physical Impact on Soils (Increased Erosion /Compaction).....	37
6.1.3	Soil and Diminished Land Use Capability.....	37
6.2	Impacts On The Biological / Biodiversity Environment.....	38
6.2.1	Aquatic Ecology - Alteration of Hydrological and Geomorphological Processes.....	39
6.2.2	Ecological Connectivity and/or Ecological Disturbances.....	39
6.2.3	Impacts on Social And Socio-Economic Environment.....	40
6.3	Socio-economic - Disruption of Farming /Agricultural Operations	41
6.3.1	Social – Farm Safety & Security.....	41
6.3.2	Groundwater Contamination.....	42
6.3.3	Groundwater – Reduction in Groundwater Resource Availability.....	44
6.3.4	Heritage – Archaeological, Cultural, and Historical Impacts.....	45
6.3.5	Heritage -Paleontological Impacts.....	46
6.3.6	The 'No-Go Alternative' Impacts.....	46
6.3.7	Cumulative Impacts.....	47
7	CONCLUSION AND RECOMMENDATION	48
7.1	Conclusion.....	48
7.1.1	Ecological integrity.....	48
7.1.2	Economic efficiency.....	48
7.1.3	Equity and social justice.....	48
7.2	Recommendations	48
	REFERENCES:	49

TABLES

Table 1:	Particulars of the Proponent and Mining Claim Holder.....	9
Table 2:	Particulars of the Mining Claim.....	9
Table 3:	Standard Terms and Conditions Attached to Mining Claims.....	11
Table 4:	Listed Activities Triggered by the Project.....	12
Table 5:	Exposed Pegmatite on MC-70725.....	15
Table 6:	An Old Exploration Pit Left Uncovered.....	16
Table 7:	Summary of Issues or Impacts.....	21
Table 8:	Review of Available Alternatives.....	23
Table 9:	Applicable Policies and Regulations and Policies.....	25
Table 10:	Treaties and Protocols.....	27
Table 11:	List of Mammals.....	31
Table 12:	Criteria for Assessing Impacts.....	33
Table 13:	Additional Assessment Criteria.....	35
Table 14:	Physical Environmental Aspects.....	36
Table 15:	Accidental Escape of GHG Emissions.....	36
Table 16:	Potential Impacts on Soil.....	37
Table 17:	Impacts from Soil & Diminished Land Use.....	38
Table 18:	Impacts on the Biodiversity Environment.....	38
Table 19:	Alteration of Hydrological & Geomorphological Process.....	39
Table 20:	Ecological Connectivity and Ecological Disturbances.....	40
Table 21:	Impacts on Socio-economic Environments.....	40
Table 22:	Disruption of Farming Operations.....	41
Table 23:	Farm Security & Security.....	42

Table 24: Groundwater Contamination.....	43
Table 25: Reduction in Groundwater Resource Availability.....	44
Table 26: Destruction or Damage to Archaeological and Historical Resources.....	45
Table 27: Destruction of Fossils.....	46

FIGURES

Figure 1: ECC granted for SPS Mining.....	10
Figure 2: Project Site in Relation to Nearest Towns.....	14
Figure 3: Project Site – Mining Claim in Relation to Farm Location.....	14
Figure 4: Access Road to the Farmland where MC-70725 is Situated.....	15
Figure 5: A Farm Route Leading to MC-70725.....	15
Figure 6: A Typical Drill Rig Truck (Source: African Drilling).....	18
Figure 7: Dust Generated During Drilling Activities (Source: torqueafrica.co.za).....	18
Figure 8: Vegetation Clearing Around a Drilling Site (Source: African Drilling).....	19
Figure 9: A Diamond Drill Site in Oshikoto.....	19
Figure 10: A Truck Mounted RC Drill Rig.....	19
Figure 11: Core Sample of Shale Rock.....	19
Figure 12: Core Sample – Granite Rock.....	19
Figure 13: Average Temperatures.....	28
Figure 14: Average Rainfall.....	28
Figure 15: Sun Hours around the project site.....	29

ABBREVIATIONS AND ACRONYMS

BAT	- Best Available Technology
BRMG	- Base and Rare Metals Group
CapEx	- Capital Expenditure
dBa	- Decibels
EC	- Environmental Commissioner
ECC	- Environmental Clearance Certificate
EIA	- Environmental Impact Assessment
EMP	- Environmental Management Plan
ERP	- Emergency Response Plan
FM	- Farm Manager
GPS	- Global Positioning System
ha	- hectare (1 ha = 10 000 m ²)
HPP	- Harambee Prosperity Plan
IAPs	- Interested and Affected Parties
IMG	- Industrial Minerals Group
LDV	- Light Duty Vehicle
m ²	- square meters
MAWLR	- Ministry of Agriculture, Water and Land Reform
MSDS	- Manufacturer Specification Data Sheet
MC	- Mining Claim
MCRC	- Mining Claim Registration Certificate
MEFT	- Ministry of Environment, Forestry and Tourism
MHSS	- Ministry of Health and Social Services
MME	- Ministry of Mines and Energy
NEPL	- Non-Exclusive Prospecting Licence
NHC	- National Heritage Council
NSI	- Namibia Standards Institute
OpEx	- Operational Expenditure
PPE	- Personal Protective Equipment
SHE	- Safety, Health & Environment
SME	- Small and Medium Enterprises
SPS	- Semi-precious Stones
SSM	- Small-scale Miners or Small-scale Mining

DEFINITION OF TERMS

Accessory works	Means any buildings, plant or other structure required for purposes of mining operations or for the disposal of any mineral mined in the course of any such operation, including <ul style="list-style-type: none"> ❖ Any power plant, transmission line or substation; ❖ Any water boreholes, well, pipeline, pump station tank or dam; ❖ Any airfield, helicopter landing-pad, road, gate, rail or railway siding; ❖ Any workshop, hangar, store or office; ❖ Any explosive magazine; ❖ Any sampling plant, processing plant, smelter, etc. ❖ Any waste disposal site, and ❖ Any campsite or temporary or permanent, etc.
Beneficiation	In the context of this project means crushing, milling and thoroughly mixing of shale clay into a mouldable paste substance followed by extrusion and cutting of bricks, drying and firing.
Cumulative Impacts	In the context of quarrying, cumulative impacts would mean the impacts of quarrying activities which in themselves may not significant but may become significant when added to the existing and potential impacts resulting from similar or diverse activities or underrating in the area.
Environmental Component/Aspect	An attribute or constituent of the environment (i.e. air quality; waste management, seismicity, soil, groundwater; terrestrial ecology, noise, traffic, socio-economic) that may be impacted by the proposed project.
Environmental Impact	A description of the potential effect or consequence of an aspect of the development on a specified component of the biophysical, social or economic environment within a defined time and space.
Environmental Management Plan (EMP)	A working document which contains site specific plans to ensure that environmental management practices to eliminate and control environmental impacts are followed during the developmental phases of that site, project and or facility and would normally consist of construction phase, operational phase and decommissioning phases.
Environmental Monitoring	Means collection, evaluation and summarization of environmental data by continuous or periodic monitoring of certain qualitative and quantitative indicators characterizing the state of environmental components and their modification as a result of the impact of natural and anthropogenic factors.
Excavation	Means any trench, pit, shaft or other open or underground working made in the course of prospecting or mining operations, as the case may be, excluding any superficial excavations made for purposes of geochemical soil and rock sampling.
Waste	Means any waste rock, tailings, slimes or other residue derived from any prospecting operations, mining operations or processing of any mineral or group of minerals.
Good Mining Practice or Good Prospecting Practice	Means any practices which are generally accepted by persons involved in mining operations, prospecting operations, as the case may be, in other countries of the world as good, safe and necessary in carrying out any such operations in relation to a mineral or a group of minerals
Mineral Group	Means in relation to minerals, means the precious metals group, the base and rare metals group, the precious stones group, the semi-precious stones group, the industrial minerals group, the dimension stone group, the non-nuclear fuel minerals group or the nuclear fuel minerals group
Hazardous Waste	Any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have detrimental impact on health and the environment.
Base and Rare Metals Group (BRMG)	Include these minerals: aluminium, antimony, arsenic, beryllium, bismuth, cadmium, caesium, chromium, cobalt, copper, gallium, germanium, hafnium, indium, iron, lead, manganese, mercury, molybdenum, nickel, niobium, radium, "Rare Earths" or lanthanides, including the actinides, scandium and

	yttrium, rhenium, rubidium, selenium, tantalum, tellurium, thallium, tin, tungsten, vanadium, zinc or zirconium, but does not include any such minerals if such mineral is incidentally included in a mineral falling in any other group of minerals
Industrial Minerals Group (IMG)	Includes these minerals: alunite, andalusite-sillimanite-kyanite, anhydrite, aplite, asbestos, barite, beryl (excluding beryl as a source of beryllium metal or as a semi -precious stone), boron minerals, calcium carbonate, celestite, clay (including bentonite and Fuller's Earth (Palygorsite and attapulgite), ball clay, halloysite, hectorite, kaolin, refractory clay), corundum, diatomite, dolomite, epsomite, feldspar, fluorite, garnet (for industrial purposes), graphite, gypsum, heavy mineral sands, iodine minerals, leucoxene, lithium minerals, limestone and marble, magnesite, mica, nepheline syenite, nitrate, olivine, perlite, phosphate, fossil guano, quartz (for industrial purposes), picture-stone, potash, pumice, pyrophyllite, salt, sepiolite, silica sand, soapstone, soda-ash and other sodium compounds, strontianite sulphur and pyrite, talc, vermiculite, wollastonite
Interested and Affected Parties	All persons who may be affected by the project either directly or indirectly, or who have an interest or stake in the area to be affected by the project, including neighbouring landowners & Road Fund Administration.
Lithium Ore	In the context of this report, Lithium Ore is produced by mining and crushing lithium bearing pegmatite and delivering the crushed aggregates to the port as 'Direct Shipping Ore' without having transformed (processed) the crushed rock into a concentrate.
Mining Claim	Means a claim not exceeding an area of 18 ha registered under section 36 of the Minerals Act and includes the renewal of the registration of any such claim.
Mitigation	Measures designed to avoid, reduce or remedy adverse impacts.
Non-compliance	Issues that are in direct non-compliance with the requirements, commitments and/or management measures as approved in the EMP.
Non-exclusive Prospecting Licence	Means a non-exclusive prospecting licence issued under section 21 of the Minerals (Prospecting and Mining) Act and includes the renewal of any such licence;
Prospecting	Means intentionally searching, whether by way of excavations or otherwise, for any mineral or group of minerals with a view to delineating or evaluating deposits or concentrations of any such mineral or group of minerals, but does not include mining
Prospecting Operations	Means any operations carried on in connection with prospecting, including any accessing, extraction or incidental winning of any mineral or group of minerals for the purposes of mineralogical examination, assaying, test work or marketability surveys;
Overburden	The soil layer that lies above the shale clay slates below 350 mm from the ground level. The first 350 mm layer of the overburden comprises of topsoil which supports the rooting system for vegetation and should be set aside and preserved for future rehabilitation.
Sensitive Area	A sensitive area or environment is described as an area or environment where a unique ecosystem, habitat for plant and animal life, wetlands or conservation activity exists or where there is high potential for ecotourism

1 PROJECT BACKGROUND

1.1 INTRODUCTION

This is an application to amend an Environmental Clearance Certificate granted to mine semi-precious stones (SPS) from one single mining claim pegged on a privately owned farm in the Karibib district of Erongo Region. The particulars of the mining claim holder (MCH) who is the project proponent, and those of the mining claim (MC), are presented in Tables 1 & 2, respectively.

The mining claim was pegged on 29 June 2018, in terms of the Minerals (Prospecting and Mining) Act, and registered with the Ministry of Mines & Energy (MME). Furthermore, an ECC was granted permitting SPS mining - the mineral group specified on the Mining Claim Registration Certificate (MCRC).

Having successfully pegged and registered the MC with MME and obtained an ECC, the MCH resolved to conduct prospecting and exploration for base and rare metals group (BRMG) and industrial minerals group (IMG) on the same MC, concomitant with SPS mining. However, such target minerals are not specified on the MCRC. When MME was requested to include BRMG and IMG on the MCRC, the MCH was informed that the request will only be entertained when the ECC has been amended allowing exploration for such group minerals.

1.2 THE PROPONENT AND MINING CLAIM HOLDER

The proponent has a long history of mining SPS and is one of the few successful small-scale miners (SSM) in the subsector. The particulars of the proponent are presented in **Table 1** below.

Table 1: Particulars of the Proponent and Mining Claim Holder

Name	Jeano Foelscher (Mr)
Contact No.	081 785 8576
Email:	j.foelscher@yahoo.com
Occupation/Profession	Small-scale Miner
Years of experience	±20 years of semi-precious stone mining
Postal Address	Box 67 Karibib Erongo Region
Physical Address	14 Richthoma Street Vineta Swakopmund Erongo Region

1.3 THE MINING CLAIM

In terms of the Minerals Act, a MC should have a rectangular shape with the longest side not exceeding 600 m and the shortest side not exceeding 300 m. The total area coverage of a mining claim must not exceed 18 hectares. The mining claim was designated the number 70725 by MME, hence MC-70725. Details of MC-70725 are presented in Table 2, below.

Table 2: Particulars of the Mining Claim

Registered MC No.	Date MC Pegged	Current MC Status	Coverage (ha)	Current Mineral Group	Additional Mineral Group
MC-70725	29 June 2018	Application	15.15	SPS	IMG BRMG
Total Coverage			15.15		
Exploration footprint (core drill holes) (5%)			0.7		
Approximate mining footprint in the event of a mineral deposit (60%)			9		

1.4 ENVIRONMENTAL CLEARANCE CERTIFICATE

The project was granted an ECC – 2300296 allowing for SPS mining from MC-70725. The ECC, attached in **Fig. 1** was granted on 17 April 2023 and expires on 17 April 2026.

1.5 APPOINTMENT OF EIA CONSULTANT

Ekwao Consulting was appointed by the MCH to attend to the amendment of the ECC with MEFT. This report covers the following reports as per the screening notice issued by MEFT (**APP003212**):

- Scoping Assessment Report
- Environmental Management Plan, and
- Proof of public consultation



REPUBLIC OF NAMIBIA
MINISTRY OF ENVIRONMENT, FORESTRY AND TOURISM
OFFICE OF THE ENVIRONMENTAL COMMISSIONER

ENVIRONMENTAL CLEARANCE CERTIFICATE
ISSUED

In accordance with Section 37(2) of the Environmental
Management Act (Act No. 7 of 2007)

TO

Jeano Foelseher
P. O Box 67, Karibib

TO UNDERTAKE THE FOLLOWING LISTED ACTIVITY
Small Scale mining (Semi precious stones)
on Mining Claims 70725, Erongo Region

Issued on the date: 2023-04-17
Expires on this date: 2026-04-17

(See conditions printed over leaf)



Figure 1: ECC granted for SPS Mining

1.6 TERMS AND CONDITIONS ATTACHED TO MC-70725

In **Table 3** below are the standard terms and conditions that are applicable to MC granted by the Mining Commissioner the relevant sections in the Minerals Act.

Table 3: Standard Terms and Conditions Attached to Mining Claims

Condition/Terms	Section of MA
<ul style="list-style-type: none"> Enter into a written agreement with the landowner 	Section 52(1)(a)(i)).
<ul style="list-style-type: none"> Exercise his rights reasonably and in such a manner that the rights and interests of the landowner or land occupier are not adversely affected, except to the extent to which such owner or occupier is compensated. 	
<ul style="list-style-type: none"> Not erect or construct any accessory works on a mining claim area without the permission of the Mining Commissioner. 	Section 31 (3)
<ul style="list-style-type: none"> Maintain in good condition and repair all accessory works. 	
<ul style="list-style-type: none"> Carry on mining operations in accordance with good mining practices 	Section 31
<ul style="list-style-type: none"> Always maintain all claim beacons in good condition 	Section 28(6) & (7)
<ul style="list-style-type: none"> Take reasonable steps to warn persons who may from time to time be in the vicinity of any accessory works of any possible hazards 	
<ul style="list-style-type: none"> Give notice to the Mining Commissioner of the discovery of any mineral or group of minerals other than the mineral group to which his mining claim relates within 30 days of such discovery. 	
<ul style="list-style-type: none"> In the case of a natural person, give notice to the Mining Commissioner of any change of the address of such person within 30 days of such a change. 	
<ul style="list-style-type: none"> Keep at an address in Namibia a proper record in relation to any mining operations for a period of not less than three years 	Section 45(1)(i)
<ul style="list-style-type: none"> Submit monthly reports to the Mining Commissioner within 15 days after the end of each month 	Section 45(1)(d)
<ul style="list-style-type: none"> Submit annual reports to the Mining Commissioner within 60 days after 31 December of each year. 	Section 45(1)(e)

1.7 MOTIVATION AND RATIONALE FOR AMENDMENT

The MCH would like BRMG and IMG added on to the MCRC so as to allow for exploration of such minerals and to enhance the understanding and the extent of mineralisation for such minerals in the section of KPB covered by MC-70725. In terms of section 31 of Minerals Act, the MCH is entitled:

- To carry on mining operations on such mining claim for any mineral or group of minerals in respect of which the mining claim has been registered.
- To carry on, on such mining claim in lieu of any mining operations, any prospecting operations in relation to any mineral or group of minerals for a period not exceeding six months from the date on which such mining claim is registered or upon the expiry of such period as maybe determined by the Mining Commissioner in writing.
- In conjunction with any mining operations referred to above, to perform any prospecting operations in relation to any mineral or group of minerals.
- Furthermore, the holder of a mining claim is entitled to remove any mineral or group of minerals other than a controlled mineral or sample of such mineral or group of minerals, for any purpose other than sale or disposal, from any place where it was won or mined in the course of mining operations or found, or incidentally won in the course of prospecting operations to any place in Namibia.

It should be emphasised here that, mining claims are exclusively granted to Namibian citizens only, who acquire such mining rights by first applying for Non-Exclusive Prospecting Licence (NEPL). The legislature intended to promote the participation of Namibian citizens in the mineral resource sector of the country by making the mineral acquisition process less cumbersome to the citizens, which leads to the socio-economic development of the regions and ultimately that of the entire country.

Since mining is a high capital intensive undertaking, a MC holder is permitted to enter into a Mineral Agreement with persons who are non-Namibian citizens for the purpose of pooling resources together to undertake mining operations. It should be noted that the Mining Commissioner has to be notified of such agreements and in some instances approvals of the Minister may be required.

1.8 LISTED ACTIVITIES TRIGGERED BY THE PROJECT

The promoter would like to conduct prospecting and exploration for BRMG and IMG on MC-70725 which covers about 15 ha (Table 2). The decision to conduct exploration was motivated by results of soil samples collected from the MC which yielded good grades of tin and tantalite (BRMG) and lithium (IMG). The project has triggered listed activities in terms of the Environmental Impact Assessment presented in Table below:

Table 4: Listed Activities Triggered by the Project

Listed Activity	Section of the Act	Findings of Scoping Assessment
Energy Generation, Transmission and Storage Activities	1(a) Construction of facilities for electricity generation 1(b) The transmission and supply of electricity	The energy requirement of the project is very minimal and limited to providing lighting at the campsite. This can be met from two sources: <ul style="list-style-type: none"> • Electricity generated onsite by a small generator at the campsite. • Electricity generated from alternative sources such as from a solar power system. This option is highly recommended.
Waste Management Treatment, Handling and Disposal Activities	2.1 The construction of facilities for waste sites, and the treatment and disposal of waste. 2.2 Any activity entailing a scheduled process referred to in the Atmospheric Act of 1976. 2.3 The importing, processing, use and recycling, temporary storage, transit or exporting of waste.	The project will generate all types of waste but the volume /quantities involved is very small. These types of waste will be generated. such as: <ul style="list-style-type: none"> • Inert waste • E-waste • Household waste • Hazardous (spill, leaks, etc.) The disposal of waste generated has also to be considered and implemented.
Mining and Quarrying Activities	3.1 The construction of facilities for any process or activities that require a license, right or other form of authorisation, and the renewal of a licence, right or other form of authorisation, in terms of the Minerals (Prospecting and Mining) Act, 1992. 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 proponent has two licences as stipulated in the Minerals (Prospecting and Mining) Act which are: <ul style="list-style-type: none"> • Non-Exclusive Prospecting Licence, and • Mining Claim The above two licenses have triggered listed activities.
Forestry Activities	The clearance of forest areas, deforestation, afforestation, timber harvesting, or any other related activity that requires authorisation in terms of the Forest Act, 2001 (No. 12 of 2001) or any other law	Vegetation clearing will occur during the construction of support infrastructure such as the campsite and laydown areas. Construction of access roads to exploration sites will also require some vegetation clearing, but the footprint is small. Impacts on biodiversity
Land Use and Development Activities	5.3 Construction of veterinary and protected areas, game proof and international boundary fence	The project is on a farm (private land) and will therefore have some impacts on land use and productivity
Agriculture and Aquaculture Activities	No specific section of the act is applicable.	The mining claim is pegged on commercial farm on which agricultural activities are conducted, i.e. rearing of livestock and game.
Water Resources Development	8.1 Abstraction of ground or surface water for industrial or commercial purposes. 8.2 The abstraction of groundwater at a volume exceeding the threshold authorised in terms of a law relating to water resources	The operation will require the use of water both for human consumption and drilling activities. The proponent does not intend to drill a borehole for its water requirement but will source its water from neighbouring towns

	8.8 Construction and other activities in water courses within flood lines. 8.9 Construction and other activities within a catchment area	
Hazardous Substance Treatment, Handling & Storage	9.1 The manufacturing, storage, handling or processing of a hazardous substance defined in the Hazardous Substances Ordinance, 1974 9.3 The storage and handling of a dangerous goods, including petrol, diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of more than 30 m ³ at any one location.	The operation will handle & store different types of hazardous substances such as fuel, oil, chemicals, etc. The operation will also has to dispose of all hazardous waste generated during the course of exploration activities.
Infrastructure	The construction of any: 10.1 any structure below the high watermark of the sea	The operation will construct support infrastructure such as a campsite, laydown areas, access routes to exploration site, site office, ablution facilities, fencing, etc.

1.9 ASSUMPTION AND LIMITATIONS

Ekwa Consulting has assumed that it has been provided with all relevant project information and that it was correct and valid at the time that it was provided;

- The EIA has considered the environmental impacts associated with exploration activities more specifically with drilling of core holes using a diamond drilling rig mounted on a road truck or transported to the site by a lowbed. The technical specifications used for core hole drilling are based on generic industry information and drilling campaigns in the area and may vary slightly at this specific MC which this scoping assessment is based on.
- It has been assumed that there will be no significant changes to the project description or surrounding environmental ASPECTS between the completion of the EIA, the granting of the ECC, the duration it takes to have BRMG and IMG specified on the MCRC by the Mining Commissioner and the appointment of the exploration drilling company on MC-70725, that could substantially influence THE findings and recommendations with respect to mitigation measures AS provided in the EMP.
- The Scoping has not considered the assessment of impacts from any mining activities with respect to BRMG and IMG in the absence of a defined mineral deposit of size, scale and scope that it can be mined economically. It is recommended that an EIA for mining related activities of any mineral that may be discovered, should be made before any mining operations for such a deposit maybe started.

2 PROJECT DESCRIPTION

The project entails prospecting and exploration of tin and tantalite minerals that fall into the category of BRMG and lithium metal which falls in the category of IMG. The project will take place on MC-70725 which covers a geographical footprint of 15 ha (**Table 2**) – a very small area when compared to areas traditionally covered by Exclusive Prospecting Licenses (EPLs).

The mineral commodities targeted for exploration are pivotal in the transition to a carbon-free world. There is therefore a surge in demand for such minerals in the world especially the developed countries of the globe. The decision to conduct exploration was precipitated by soil samples collected from the MC which yielded good grades for such minerals. There appears to be renewed interests from Exploration Companies in the country in the same localities which fits in well with the long term plans of the proponent.

2.1 PROJECT SITE AND ACCESSIBILITY

MC-70725 is pegged on a commercial farm – Kaliombo situated in the Karibib district in the Erongo Region, as more or less depicted in **Figures: 3 & 4**. Taking the settlement of Wilhelmstal as a reference point, the project site is reached by driving for about 8 km on the B2 trunk road in the direction of Karibib, followed by 7 km on a gravel farm road. Karibib is the nearest town to the project site.



Figure 2: Project Site in Relation to Nearest Towns



Figure 3: Project Site – Mining Claim in Relation to Farm Location

2.1.1 EXISTING SERVICES

Unlike several MCs held by the same promoter where intensive mining activities have been carried out, limited mining has been performed on this site. There are no accessory works established on MC-70725.

2.1.2 WATER AVAILABILITY

There is no water on the project site, but there are boreholes sunk on the farm supplying water to the farming operations. The proponent will have to negotiate with the landowner to obtain water.

2.1.3 ELECTRICITY RESOURCES

There is no electricity on the farm but an 11kVa line was observed with a radius of 10 km of the project site.



Figure 4: Access Road to the Farmland where MC-70725 is Situated



Figure 5: A Farm Route Leading to MC-70725



Table 5: Exposed Pegmatite on MC-70725



Table 6: An Old Exploration Pit Left Uncovered

2.2 MINERAL ACQUISITION

In Namibia, mineral rights is vested in the State (section 2 of the Minerals Act), and no person shall carry on, any reconnaissance operations, prospecting operations or mining operations in, on or under any land in Namibia, unless that person is in possession of a non-exclusive prospecting licence (NEPL), a mining claim (MC) or a mineral licence, as the case may be (section 3(1)(a)), issued by MME.

The proponent has an NEPL and MC-70725, and intends to conduct prospecting and exploration in order to discover mineral deposit(s) that can be mined economically.

2.3 SEARCH FOR MINERALS

Exploration is the scientific method of locating or finding mineral deposits of appropriate size and grade that can be profitably exploited. Mineral deposits can be exposed to the surface of the earth or hidden below overburden of sediments or barren rock cover. The operation planned by the proponent will include at least four of these activities, viz.

- Reconnaissance
- Prospecting (non-invasive),
- Exploration (invasive)
- Mining, and
- Post exploration - decommissioning of any established accessory works, and

These activities are briefly described in the context of this project.

2.3.1 RECONNAISSANCE LICENCE

This is the first step in the search for any mineral or group of minerals and includes various methods such as aerial sensing techniques, remote sensing (using either ground based, airborne or satellite devices), geophysical surveys, photogeological mapping or imagery.

Three licenses allowing reconnaissance activities are available under the Minerals Act, viz.

- **NON-EXCLUSIVE PROSPECTING LICENCE (NEPL)** – is for Namibian citizens only and has no restriction with respect to minerals that can be searched or an area that can be explored. To a large extent, the activities allowed under the NEPL are non-intrusive.
- **RECONNAISSANCE LICENCE** – target minerals are to be stated and the area of interest specified. A reconnaissance license is valid for six months and maybe extended for a further six months at the discretion of the Minister and good motivation provided. All activities allowed under a reconnaissance licence are non-intrusive.
- **EXCLUSIVE PROSPECTING LICENCE** – target minerals and exploration area are to be specified and identified. Maximum land allowed is 100 000 ha and validity is three years renewable two times each renewal period not exceeding two years. Most prospecting activities conducted under an EPL are intrusive.

Pegging of any mining claim (MC) is preceded by prospecting conducted under an NEPL. In this connection, the promoter has already conducted exploration and identified an area of interest which he secured by pegging a mining claim over such an area, i.e. MC-70725.

2.3.2 PROSPECTING

Prospecting involves searching for mineral deposits that can be mined economically and an NEPL granted in terms of the Minerals Act is required. The activities involved to search for minerals are mostly non-intrusive techniques and methods and include:

- desktop studies,
- soil /rock sampling,
- identification of surface mineral outcrops,
- observation of irregularity and variations in colour, shape & rock composition;

- geological mapping,
- ground geophysics, etc.

The bulk of the activities will be performed out in the field with the exception of desktop studies and mapping. It is expected that prospecting will be performed by a qualified and an experienced exploration geologist.

2.3.3 EXPLORATION

Potentials areas identified during prospecting are followed up during this phase as exploration targets based on local geology, results of any data analysed, etc. This phase is associated with activities that are intrusive in nature and will, amongst others, include:

- geochemical surveying;
- pitting and trenching;
- geophysical surveying;
- drilling on an identified area
- assaying of collected samples, etc.

There are different types of drilling methods used in exploration, with the most common being:

- auger drilling
- rotary air blast drilling
- reverse circulation drilling
- diamond core drilling

The types of drilling to be used will depend on a number of factors such as geological formation, environmental factors, cost, accessibility to the site, fuel and water supply. Once a target area has been identified on MC-70725, these invasive activities will be employed to investigate potential mineralisation. These will include:

2.3.3.1 Soil Sampling

This process includes taking small amount of soil material from the MC and sending those off to accredited laboratories for analysis. Care should be taken to limit the footprint where sample is extracted.

Potential Impacts:

Vegetation clearance, destruction of habitat, dust pollution, topsoil disturbance, potential for soil erosion, etc.

2.3.3.2 Pitting and Trenching

Shallow pits and or trenches are excavated for the purpose of extracting samples from rocks below the subsurface. Extracted samples are mixed, homogenized and sent off for analyses. The position of pits and trenches must be well planned and excavation done with minimal impacts to the environment.

Potential Impacts:

Vegetation clearance, destruction of habitat, dust pollution, topsoil disturbance, potential for soil erosion, noise and vibration, gaseous emission, etc.

2.3.3.3 Drilling

The areas identified as having strong potential for mineralisation on MC-70725 are followed up by drilling. This could be reverse circulation (RC) and diamond core (DC) drilling . The layout of drilling holes Drilling This is done by linking of prepared maps with topo-grid and

DC involves the use of diamond fortified drill bits attached to hollow drill rods that extract and delivers to the surface a continuous rock column from hundred meters below the earth. DC produces most accurate rock samples because the whole core is brought to the surface for cutting, examination and analysis. The drawbacks with the DC method are:

- massive water requirements during the drilling operation
- high operating costs including the replacing of drill bits

- use of powerful big drill rigs.

With RC a rotating hammer is used to break the rock being drilled with the cuttings sent up to the surface through a hollow rod and a compressor. The advantages of RC are that it is cost effective because mechanical work is accomplished by means of compressed air and water is not needed for the operation. It is also fast.

Potential Impacts:

Potential contamination of surface and groundwater resources, noise and vibrations from exploration drill rigs, soil profile disturbance, potential for soil erosion, gaseous emission, visual impacts, etc.

2.3.3.4 Decommissioning

Any accessory works (exploration campsite, ablution facilities, laydown areas, access routes, etc.) developed to support the exploration have to be decommissioned at the end of the exploration phase and the site rehabilitated to, as far as possible, pre-exploration state.

2.3.4 MINING OPERATION

Whilst the MC protocol allows both exploration and mining operations to be carried out on the same mining claim at the same time, at this point it is not possible to provide mitigation measures for mining activities in the absence of any specific mineral deposit having been confirmed through exploration. The nature of the mineral deposit, its size, geological characteristic and envisaged mining scale are important parameters that are unknown at this stage.



Figure 6: A Typical Drill Rig Truck (Source: African Drilling)



Figure 7: Dust Generated During Drilling Activities (Source: torqueafrica.co.za)



Figure 8: Vegetation Clearing Around a Drilling Site (Source: African Drilling)



Figure 9: A Diamond Drill Site in Oshikoto



Figure 10: A Truck Mounted RC Drill Rig



Figure 11: Core Sample of Shale Rock



Figure 12: Core Sample – Granite Rock

2.4 KEY PROJECT COMPONENTS

The main component for this project is exploration drilling on MC-70725. This will be accomplished through these steps.

Planning and Mobilisation Phase

- Mobilisation of Resources
- Compliance Issues
- Communication with Stakeholders

Establishment of Support Infrastructure

- Construction of a campsite and laydown areas
- Site admin office
- Ablution facilities
- Onsite accommodation

2.4.1 PLANNING AND MOBILISATION PHASE

This is essentially the planning phase of the project in which the proponent is expected to identify professional service providers, i.e. a consulting exploration geologist to prepare the exploration programme, to layout the position of each drill hole based on the results of the analysis of geophysical data or historical data integration. Environmental sensitivities should be taken into account when siting locations of drill holes, and where possible disturbed areas should be selected.

The number of holes, spacing and depth should be defined prior to the arrival of drill rig at the mining claim. A cost estimate for drilling work is also ascertained from drilling companies during this time.

The next step is to ensure that all compliance related issues are dealt with, i.e. ECC is obtained by the Environmental Commissioner, the Mining Claim Registration Certificate is granted by the Mining Commissioner reflecting BRMG and IMG. The agreement with the landowner should also be finalised and in place. There are no environmental impacts associated with this phase.

2.4.2 PROVISION FOR SUPPORT INFRASTRUCTURE

An area on MC-70725 should be identified where a campsite is to be established to accommodate the machinery and equipment for the exploration crew. The site selected should be big enough to accommodate all requirements of the project, a site office, chemical toilet or ablution facilities. It is expected that the exploration crew will stay on the campsite during the entire duration of exploration.

Where possible site the campsite should on disturbed area of the MC-70725 and away from any sensitivities. Minimal vegetation should be cleared. Establish if the farm internal route leading to MC-70725 is wide enough to accommodate the drill rig truck. If widening of the access route is required, obtain permission from the landowner and ensure that this is done with minimal disturbances to vegetation hence loss of grazing.

A campsite is a considered as accessory works and written consent must be obtained from the Mining Commissioner prior to establishing.

Once the location of the campsite has been identified, the layout of the campsite should be prepared by the exploration contractor appointed to carry out the drilling work. Should any obstacles or sensitivities be identified by the contractor, the location and layout should be relocated/adjusted to a nearby location on the MC where no obstacles/sensitivities exist. These activities should be followed up with safety checks, drills and communication tests.

2.4.3 DRILLING PROCEDURE

The proponent is proposing to use a diamond core drilling method to drill stratigraphic core boreholes to determine mineral potential. This is the same technique used by exploration companies drilling in the same area. The core boreholes and the equipment used to drill them are of the same type and scale as that used to drill water boreholes.

Drilling requires the use of a truck or trailer mounted, mobile drilling rig at target sites. The drill rig would arrive at MC-70725 accompanied by supporting equipment (vehicles, trailers, compressors, water tanks, pumps, caravan, etc.) and would be manned by a staff of approximately six to eight people. A typical diamond core drill rig and equipment requires an operating area of approximately 1 000 m². Core drilling uses a diamond bit (approximately 8.5 cm in diameter), which rotates at the end of drill rod (or pipe).

The diamond bit is rotated slowly with gentle pressure while being lubricated with water to prevent overheating. The driller adjusts the rotation speed, pressure and water circulation for different rock types and drilling conditions so as to avoid problems, such as the bit getting stuck or overheating.

Highly fractured rocks (often encountered near the surface), in addition to the increased risk of getting the bit stuck, allow the water to escape, leading to an increased risk of overheating. This problem is minimised by injecting biodegradable drilling fluid or mud into the drill hole to “plug” the fractures and prevent escape of the fluids, as well as to lubricate the drill bit, remove drill cuttings and maintain ideal hole conditions.

The opening at the end of the bit allows a solid column of rock to move up into the drill pipe and be recovered at the surface. Inside the drill pipe is a “core tube”, which has a latching mechanism attached to a cable. The cable is used to winch the core tube containing the new rock core to the surface where it is recovered. The drill core is stored in specially designed core boxes containing compartments to hold sections of the core before being taken to the laboratory for desorption testing, i.e. where samples are examined, described and tested.

2.5 POTENTIAL IMPACTS

Potential impacts identified during scoping assessment are presented and briefly discussed in Table 5 below. These impacts have been assessed using the assessment methodology described in ???, while recommended mitigation measures are presented in the EMP.

Table 5: Summary of Issues or Impacts

	Key Issue or Aspect	Comments/Remarks
1.	<p>ENVIRONMENTAL IMPACTS</p> <p>Groundwater Contamination</p> <ul style="list-style-type: none"> • How many and how deep will diamond core holes be drilled? • What impact will the diamond core drilling have on groundwater? • What impact will the drilling have on the water boreholes from which water for farming operations is sourced? <p>Surface Water Contamination</p> <ul style="list-style-type: none"> • What impact will the proposed exploration activity have on surface water especially during the rainy season when non-perennial rivers carry water? Several dry streams traverse the farm which transport rainy water. • What impacts will the exploration have on the water in the earth dam excavated on the farm? • Several earth dams are on the farm dry streams traverse the farm including the project site – MC-70725 • What impact will the operation have on the available water resource on the farm? <p>Soil Contamination –</p> <ul style="list-style-type: none"> • What impact will the diamond core drilling have on surrounding soils? • What area will be required for each diamond hole? • Drill rig – is it truck mounted or crawler and transported on low-bed? <p>Air Quality/ Dust Pollution–</p> <ul style="list-style-type: none"> • Which mitigation measures will be implemented to ensure that the machinery used in the operation do not release emissions into the atmosphere • Dust generated by exploration vehicles. • Dust generated during drilling of core holes. <p>Disruptions to Agricultural Activities</p> <ul style="list-style-type: none"> • What impact will the proposed activity have on commercial agriculture? • Disruptions of farming activities – poaching, wood harvesting, etc. • Fire risk • Damage to farming infrastructure, i.e. fences, gates, etc. 	<p>Detailed assessment of these impacts are provided in this report.</p> <p>Adequate management /mitigation measures are provided in the EMP.</p>

	<p>Archaeological and Paleontological impact -</p> <ul style="list-style-type: none"> Any known graves or cultural resources on farmland? What archaeological and paleontological impacts will the proposed project have? <p>Biodiversity Impacts</p> <ul style="list-style-type: none"> The flora of the area – risk of alien and invasive species brought on the property by construction vehicles. The fauna in the project area including habitat loss; Illegal hunting and or poaching; <p>Waste Management</p> <ul style="list-style-type: none"> How will waste (drilling fluids, flowback water, etc) be managed during the drilling activities? Leaks and spills of hazardous substances used in the operation, etc. 	
2.	<p>MONITORING AND REHABILITATION</p> <ul style="list-style-type: none"> How often will the water around the wells be sampled and tested and in what radius? How would groundwater be rehabilitated in case of contamination? When the project is decommissioned, what will the monitoring process and requirements be and for how long? 	<p>Detailed description of the exploration process and the sampling process is provided.</p> <p>Risks regarding contamination of groundwater resources have been assessed as part of the EIA. Measures to mitigate any risks to groundwater and the associated monitoring frequency and parameters are provided.</p>
3.	<p>SAFETY AND SECURITY</p> <ul style="list-style-type: none"> How will the safety and security of the landowners be ensured throughout the life of the proposed project? Where will the exploration crew stay – on the farm or reside at Karibib and drive in and out every day? How many people will be on the farm (MC-70725) How long will the exploration take? 	<p>The proponent has committed to comply with terms of the access agreement with landowner including paying fair and market related compensation for loss of grazing as a result of operations on MC-70725.</p> <p>Additionally, measures have been provided in the EMP with respect to safety and security measures to cater for landowner requirements.</p>
4.	<p>BENEFITS FOR LANDOWNERS AND THE COMMUNITY</p> <ul style="list-style-type: none"> What benefits will the proposed project have for landowners. What benefits will accrue to the community at large? 	<p>The project is confined and restricted to the exploration on MC-70725 which measures 15 ha. Apart from the generation of data to inform further exploratory work there is limited financial benefit from this phase.</p> <p>Potential indirect benefits to the local communities are limited to procurements of goods and services from local suppliers.</p> <p>The broader community in the event a mineral deposit is discovered that can be mined commercially.</p>
5.	<p>EMPLOYMENT OPPORTUNITIES</p> <ul style="list-style-type: none"> What employment opportunities will the proposed project bring for the locals? How many locals and non-locals will be employed/hired? Transfer of skills and technology to the youth 	<p>Exploration work is reliant upon designated skilled contractors and, as a result, employment opportunities outside of these are limited</p>
6.	<p>EXPLORATION AND MINING RISKS/IMPACTS</p> <p>While exploration and mining are allowed under a Mining Claim, impacts associated with mining activities cannot be identified in the absence of a definite mineral deposit, suitable mining method and scale of operation</p>	<p>Exploration and Mining, while sequential in nature, are not defined as distinct activities under the Mining Claim protocol.</p> <p>The Minerals Act does not recognise the distinction and provide for a separation of application. Mitigation measures for mining operation will only be made if and when a commercially viable resource is identified through exploration.</p>
7.	<p>PHYSICAL ENVIRONMENTAL</p> <ul style="list-style-type: none"> Geological impacts – faulting, cracking open methane trapped in rock pockets. Risk to geological formations. i.e. drilling triggering earth tram or earth movements . 	<p>There has been no history of earth trams triggered by exploration and this is not expected with this exploration.</p> <p>This assessment is based on the understanding that mining will only</p>

	<ul style="list-style-type: none"> Risks associated with mining if a commercial deposit is discovered. 	<p>be embarked upon once a commercially viable mineral deposit has been discovered and the scale and scope of the mining determined.</p> <p>A full EIA for a mining operation will be required if a mineral deposit is found.</p>
8.	<p>CONTRIBUTIONS TOWARDS DECARBONISATION</p> <ul style="list-style-type: none"> How does the proposed exploration project contribute toward decarbonisation Use of alternative form of energy solar as opposed to grid power. 	<p>Decarbonisation can start with small acts such as using solar power lights instead of using a diesel powered generator set at the exploration campsite.</p> <p>Switching off machinery & equipment when not in use. Using hybrid equipment where such is available.</p>

2.6 PROJECT ALTERNATIVES

The definition of the 'alternatives' as outlined in the EIA Regulations refers to the different means of generally meeting the same purpose and requirement of a proposed activity, which may include alternatives to the:

- type of the activity to be undertaken;
- design or layout of the activity;
- technology to be used in carrying out the activity;
- property on which or location where it is proposed to undertake the activity, and
- operational aspects (or modus operandi) of the activity.

The purpose of considering alternatives is therefore to ensure that the EIA process is not simply reduced to the defense of a single project proposal, but that an opportunity for unbiased considerations of options is provided to determine the most optimal course of action from an environmental perspective. The alternatives considered were:

- Location Alternative;
- Exploration Method Alternative;
- Technology Alternative;
- Exploration Scheduling Alternative, and
- The 'No-Go Action' alternative.

Table 6: Review of Available Alternatives

Alternative	Expansion
<p>Location Alternative:</p> <p>This alternative refers to different exploration sites on the same farmland.</p>	<p>The planned exploration activities will take place on a single mining claim (MC) measuring 15 hectares (150 000 m²). The said MC has been pegged already on the farmland and registered with MME and assigned the number of MC-70725. Furthermore, the proponent has already negotiated and secured an access agreement with the landowner.</p> <p>The position of the MC cannot be changed or altered, however, different locations on the MC can be selected where to site each individual drill core hole. In this manner, areas with relatively lower sensitivity can be avoided by for instances, siting drilling sites to already disturbed areas.</p>
<p>Exploration Method Alternative:</p> <p>There are a number of exploration methods that can be used.</p>	<p>Different types of exploration methods are available which can be used to find out and to estimate volume of a commercially viable mineral deposit. This methods include invasive and non-invasive techniques. Both methods are expected to be used during the implementation of the project. If any other alternative viable exploration methods are found to achieve the same purpose more effectively and /or the least impact to the environment, such methods should be used as alternatives.</p> <p>In the event that an economically viable discovery is made, the exploration will proceed to next stage which is mining of the discovered mineral deposit. It is important to note here that before any mining activities can start, a detailed EIA specifically dealing with mining/extraction has to be conducted to assess the impacts which the envisaged mining methods and associated ore processing will have on the receiving environment.</p>

Alternative	Expansion
<p>Technology Alternative:</p> <p>Consideration of this alternative is to include the exploration technology option that achieves the same goal, but has the least impact on the environment.</p>	<p>There is a range of exploration methods and drilling rigs available to conduct exploration. Some such alternatives are discussed briefly:</p> <p>Pitting and Trenching: These are quick and cheap ways of obtaining lithological and structural information in target areas with shallow cover.</p> <p>Exploration Pitting - can provide a very large volume sample and is usually used to confirm shallow, extensive, flat lying bodies of mineralization. Large sample sizes are necessary to test for variable grade distribution of a particular mineral deposit.</p> <p>Trenching – this is usually used to expose steep dipping bedrock buried below shallow overburden. Trenches are often dug across the strike of the mineralised zone being tested. Trenches are good adjunct to reverse circulation drilling programs, where structural data from trench mapping area needed to complement the lithological information obtained from drill cutting.</p> <p>Exploration Drilling:</p> <p>Various drilling methods are used. Some of these are:</p> <ul style="list-style-type: none"> • Diamond Core Drilling • Reverse Circulation Drilling • Infill Drilling <p>These methods have numerous advantage and advantages that are different from each and the selection of which method to use is usually based on number of factors.</p> <p>Compared to diamond core drilling (DCD), reverse circulation drilling (RCD) will require less water which will put less pressure on the water supply and use. The major differences between RCD and DCD are in the rate of rock penetration and cost per meter drilled. RCD is much faster than DCD and therefore less expensive but it produces rock chips as opposed to a cylindrical piece of rock.</p>
<p>Exploration Scheduling Alternative:</p> <p>These are sometimes known as sequencing or phasing alternatives. In this case an activity may comprise a number of components which can be scheduled in a different order and or at different times and as such produce different impacts specific order</p>	<p>Exploration consists of various components which can be undertaken in sequence and at different time intervals. The explosion schedule will start with non-invasive activities which can take between 6 and 12 months to complete. This will be followed up by more invasive exploration activities, i.e. drilling that are confined to a small section of the mining claim.</p> <p>Another scheduling alternative is to confine exploration working hours to day-light hours as follows:</p> <ul style="list-style-type: none"> • Monday to Friday - 06h00 to 18h00 • Saturday 06h00 -14h00 • No work of public holidays • No work on Sundays
<p>The 'No-Go' Alternative</p>	<p>The 'No-Go' Alternative entails no change to the status quo, in other words the proposed exploration drilling activities will not be conducted on MC-70725. The option not proceed will leave the areas of the potential drilling sites in their current state.</p> <p>This alternative is not in the best interest of the overall objectives of the NDP5 and Harambee Prosperity Plan because it will result in:</p> <ul style="list-style-type: none"> • No discovery of BRMG and IMG on MC-70725; • Not being able to supply minerals that are vital for the green economy; • No local investments in the mineral resource sector by the locals; • No job creation; • No increased government revenue and general contribution to economic growth, and • Not being able to help with the transition to a low carbon economy.

3 THE LEGAL FRAMEWORK

The Republic of Namibia has five tiers of law and a number of policies relevant to environmental assessment and protection which includes the following:

- The Namibia Constitution
- Statutory law
- Common law
- Customary law, and
- International law

3.1 SPECIFIC LEGAL INSTRUMENTS

The Minerals (Prospecting and Mining) Act, No. 33 of 1992 is the specific legislation governing the mineral sector in Namibia. The Minerals Act resorts under MME and governs and allows for these mineral licenses:

- Reconnaissance Licenses
- Exclusive Prospecting Licenses
- Non-Exclusive Prospecting Licenses
- Mining Claims
- Mining Licenses
- Mineral Export Licenses

In addition to the above, the Minerals Act also allows for the monitoring of mining operations, reporting requirements, compliance to the Act, disposal methods and rehabilitations. The Mining Commissioner, is the official responsible for the implementation of the provisions of the Minerals Act as well as related regulations such Health and Safety Regulations and Explosives and associated devices used for mining applications (in conjunction with Namibian Police's Explosive Unit).

The Environmental Management Act (Act No. 7 of 2007) is the legislation responsible for conducting of EIAs, the granting of ECC including enforcing of compliance. The Environmental Commissioner is a statutory appointment made by the Minister of MEFT in terms of the EMA to oversee its implementation and administration.

3.2 OTHER APPLICABLE LEGAL INSTRUMENTS

Listed in Table below are other laws and regulations which have a bearing to the subject project.

Table 7: Applicable Policies and Regulations and Policies

Legislation	Main Aspects
Constitution of the Republic of Namibia	<p>The constitution is the supreme law in Namibia and has been hailed as one the best in the world. It provides for the establishment of the main organs of the state (Executive, Legislative and Judiciary).</p> <ul style="list-style-type: none"> • CHAPTER 3 – Fundamental human rights and freedoms. • CHAPTER 11 – Promotion of the welfare of the people • ARTICLE 95 (I) <p>Ensurance that workers are paid a living wage adequate for the maintenance of a decent standard of living and the enjoyment of social and cultural opportunities.</p> <p>ARTICLE 95(J)</p> <p>Maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilisation of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future, in particular, the government shall provide measures against the dumping or recycling of foreign nuclear and toxic waste on Namibia territory.</p>
Minerals (Prospecting & Mining) Act, Act No. 33 of 1992	<p>The Act provides for the reconnaissance, prospecting and mining of, and disposal of, exercise of control over, minerals in Namibia, including for matters incidental thereto. The relevant applicable to this project are listed here below:</p> <ul style="list-style-type: none"> • PART 2 : Rights in relation to minerals, • PART 5 : Provisions relating to non-exclusive prospecting license, • PART 7 : Pegging of Mining Claims, • PART 8: General provisions relating to mineral licenses, • PART 9 : Provisions relating to Exclusive Prospecting Licenses, and • PART 12 : Provisions relating to Mining License.

Legislation	Main Aspects
Environmental Management Act (Act. No. 7 of 2007)	<ul style="list-style-type: none"> It defines what the environment is and encourages sustainable management of the environment when natural resources are being exploited/extracted for the benefit of the residents/citizens. It also provides for a process of assessment and control of activities that are likely to pose significant effects on the receiving environment.
Environmental Management Regulations (Gazetted on 12 February 2012)	<ul style="list-style-type: none"> Heralded the implementation of the Environmental Management Act almost five years after the Act was approved by the legislature. Presents a list of activities that require an ECC prior to commencement. Regulates and provides guidelines on how EIAs must be conducted.
Local Authority Act (Act No. 23 of 1992)	<ul style="list-style-type: none"> The Act defines the powers, duties and functions as well as terms of office of local authority councils. Provides services such as water, electricity, sewage, waste removal, etc. to residents within a local area. Regulates effluent discharge into the sewer system. Issues Certificate of Fitness to all types businesses including factories operated within the town boundaries.
The Petroleum Products & Energy Act (Act No.13 of 1990 as amended)	<ul style="list-style-type: none"> The Act makes provision for the procurement, handling, storage and distribution of petroleum products. Empowers the line Minister to increase/decrease pump fuel prices in the country as well as for the imposition of levies on energy sources. Also provides for the issuing of various permits including Consumer Installation Certificate
Road Fund Administration Act	<ul style="list-style-type: none"> Regulates traffic and use of public roads including aspects related to road safety, vehicle licensing, roadworthiness, Mass Distance Charges, abnormal loads. Also administers and handles the fuel levy rebates to bulk users such as mining companies, farmers, etc.
Public and Environmental Health Act (Act No. 1 of 2015)	<ul style="list-style-type: none"> The Act provides for a legal framework for a structured more uniform public and environmental health system and for matters incidental thereto. It deals and provides guidelines on noise generation and control thereof within an urban environment. Also deals with waste management, handling or collection, waste disposal, waste recycling, sanitation, etc.
Hazardous Substances Ordinance (No. 14 of 1974)	<ul style="list-style-type: none"> Provides for the control of hazardous substances with potential to cause harm, injuries and even death. Also provides for the manufacture, handling, storage, sale, use, disposal, etc. of hazardous substances.
Atmospheric Pollution Prevention Ordinance (No. 11 of 1976)	<ul style="list-style-type: none"> Provides control of noxious or offensive gases and matters incidental thereto. Requires best practical means for preventing or reducing the escape into the atmosphere of noxious or offensive gases produced by the scheduled process.
Water Resource Management Act (2004)	<p>The following permits are required in terms of the Water Act:</p> <ul style="list-style-type: none"> water abstraction permits; domestic effluent discharge permits (site offices, construction camp); industrial effluent discharge permits; water use for dust suppression; and water reticulation permits (pipelines). <p>Will be superseded by Water Resources Management Act 2013 once the regulations are implemented in the future.</p>
The Soil Conservation Act No. 76 of 1969	<ul style="list-style-type: none"> The act makes provision for combating and prevention of soil erosion and promotes the conservation, protection and movement of soil, vegetation, sources and resources. Fuel storage and handling is more often associated with spillages which could end up contaminating the soil.
National Heritage Act No. 27 of 2004	<ul style="list-style-type: none"> No archaeological/heritage site or cultural remains may be removed, damaged, altered or excavated. Section 48 sets out the procedure for application and granting of permits, such as the permit required in the event of damage to a protected site occurring as an inevitable result of development. Part VI, Section 55 Paragraphs 3 and 4 require that any person who discovers an archaeological site should notify the National Heritage Council
Atomic Energy and radiation Protection Act (Act No. 5 of 2005)	<ul style="list-style-type: none"> The Hazardous Substance Ordinance No. 14 of 1974 was repealed and amended by the Atomic Energy and Radiation Protection Act. The Act provides for the control of substances which may cause injury or ill-health or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitising or flammable nature. Whilst the environmental aspects are not really explicitly stated, the Act provides guidelines with respect to importing, handling and storage, etc. of hazardous substances.

3.3 INTERNATIONAL AND REGIONAL TREATIES AND PROTOCOLS

The Namibia government has ratified various international treaties and protocols which make infringements on such protocols and treaties legally enforceable in Namibian courts. Some of such are protocols are listed in table below.

Table 8: Treaties and Protocols

Treaties and Protocols	Remarks
Kyoto Protocol on the Framework Convention on Climate Change	ADOPTED DEC 1997 An international treaty that commits industrialised countries to reduce greenhouse gas emissions, based on the scientific consensus that global warming is occurring and that human-made CO ₂ emissions are driving it.
Montreal Protocol on substances that deplete the ozone layer	ADOPTED IN 1987 To protect the ozone layer by phasing out the use of products that are harmful to the ozone.
SADC Free Trade Protocol	ESTABLISHED 2005: Head Quartered, Gaborone, Botswana
SADC Mining Protocol	ESTABLISHED 2006: Head Quartered in Gaborone, Botswana
The Paris Agreement	ADOPTED IN 2015: to reduce greenhouse gas emissions by 40% by 2030. Ratified by 196 signatories.
UN Convention to Combat Desertification	ADOPTED 1994: Convention to combat desertification and mitigate the effects of drought in those countries experiencing serious challenges of droughts by developing long-term strategies supported by international cooperation.
United Nations Framework Convention on Climatic Change	ESTABLISHED 1992: <ul style="list-style-type: none"> An international treaty to combat dangerous human interference with the climatic system, in part by stabilising greenhouse gas concentrations in the atmosphere' 'to allow for the ecosystems to adapt naturally to climatic changes, to ensure that food security is not threatened and to enable economic developments to proceed in a sustainable manner'.
Vienna Convention for the Protection for Ozone Layer	CONCLUDED IN 1985 'A framework agreement in which States agree to cooperate in the relevant research and scientific assessments of the ozone problems, to exchange information and to adopt appropriate measures to prevent activities that harm the ozone layer'
World Heritage Committee	ADOPTED 1972 Defines the kind of natural or cultural site that can be considered for inscription on the World Heritage List.
'Polluter Pays Principle'	ADOPTED 1972: The principle that means that 'he who causes pollution must bear the cost of cleaning up such pollution. By applying the principle, developers are incentivised to avoid environmental damage and are held responsible for the pollution that they cause.

4 THE PROJECT BASELINE ENVIRONMENT

The information in this section was compiled from a number of sources, some of which are listed below:

- Visual observations during the site visit;
- Desk study of various materials;
- Groundwater in Namibia, an exploration to the Hydrogeological Map;
- Namibia Weather Services website (www.worldweatheronline.com)
- Discussions with the Farm Manager and farming staff;
- Discussions with MC holder;
- Previous studies by the EIA Consultant
- Rangeland Monitoring Project in Namibia - an EU funded project implemented in collaboration with Agra.

4.1 CLIMATIC CONDITIONS

The information on the climatic conditions as presented here was sourced from the website 'worldweatheronline.com' with Karibib as reference point. As crow flies, Karibib is about 40 km from the project site.

4.1.1 TEMPERATURE

The temperatures are represented in **Fig. 13** below. High temperatures are recorded during the months of September through to February with the average of about 32 °C. May through to August are the coldest months when day temperatures average about 10 °C. Occasionally, temperatures have dropped below zero during June.

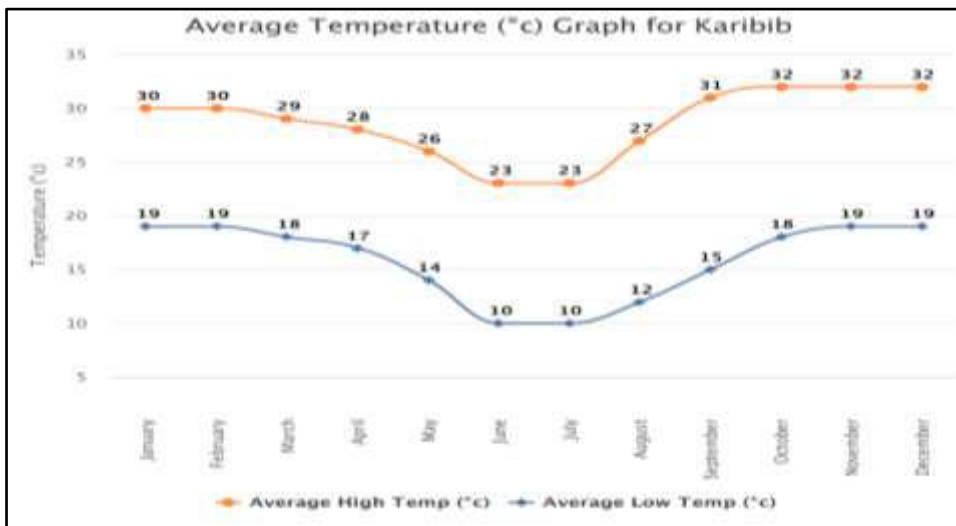


Figure 13: Average Temperatures

4.1.2 RAINFALL

The annual rainfall around the study area is highly variable and unreliable as depicted in **Fig. 14** below. Over the last ten rainfall seasons, the average annual rainfall over the project site has been 240 mm, with precipitation occurring between November through to April. Most precipitation occurs during the month of February.

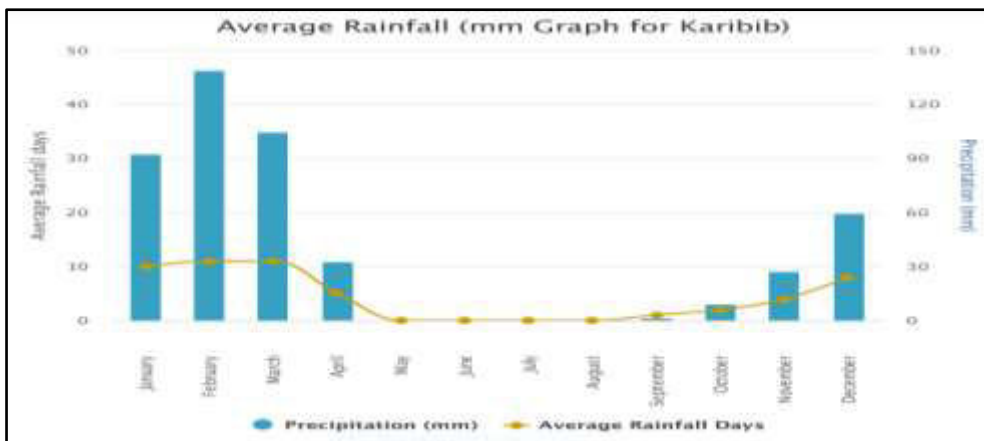


Figure 14: Average Rainfall

4.1.3 WIND PATTERN

The prevailing wind direction within the study area is predominantly from east to west. Northerly winds are infrequent, occurring mainly during the winter and spring months. Wind can occur at any time of the day or night, but the highest annual wind speeds can be expected in the afternoon hours from 12h00 to 22h00. The wind occurrence, direction and strength can have significant environmental effects – wind disperses fugitive dust from stockpile areas, during blasting, loading of dry materials, etc.

4.1.4 SUNSHINE HOURS

It is evident from **Fig. 15** below, that the project site is in an area which enjoys approximately 300 sunny days and over 3 000 sun hours per year. With that amount of sun hours, the solar irradiation can reach values of 2 200 to 2 400 kWh/m² – ideal conditions to generate electricity using photovoltaic systems.

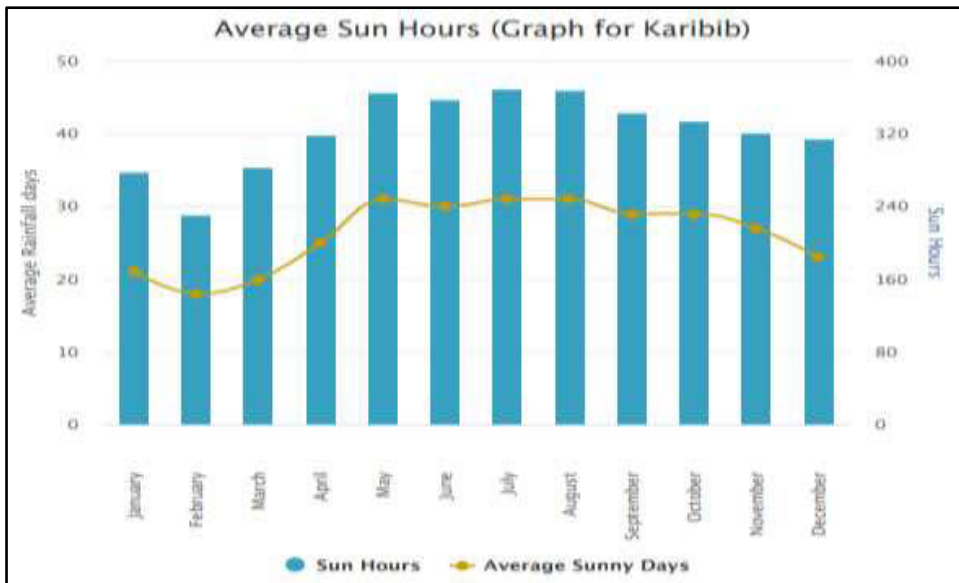


Figure 15: Sun Hours around the project site

4.2 TOPOGRAPHY AND DRAINAGE

The terrain is typically arid to semi-arid shrub land characterized by a mixture of bush, woodland and shrub-land, gradually increasing in thickness from west to east. When viewed from within a distance of about 2 000 m, the topographic relief has modest variations in elevation with a maximum elevation change of approximately 90 m across the western section of the farm.

The Khan River which originates from Otjiseмба settlement, northwest of Okahandja is the main feature in the district. A number of ephemeral watercourses were observed crisscrossing the farm draining towards the Khan River. The natural drainage on the project site is therefore towards the Khana River.

4.3 GEOLOGICAL ASPECTS AND HYDROLOGY

In Namibia, the source of lithium are granitic pegmatites that intruded the oldest rock formation – the Precambrian Damara Sequence which occurs in the Erongo Region (Cape Cross, Uis, De Rust, Omaruru, Wilhelmstal, Karibib, Otjimbingwe, etc.) and the Namaqua Metamorphic Complex that occurs in the Karas Region (Warmbad, Tantalie Valley, Sandfontein, -Ramansdrift, etc).

In the Erongo Region, four lineage pegmatite belts, all striking in a NE-SE are distinguished within the Damara Oregon. These are the Brandberg West-Goantagab Belt, the Cape Cross-Uis Belt, the Nainais-Kohero Belt and Sandamap –Erongo Belt (Keller P, 1991). The Karibib Pegmatite District and the Sandama-Erongo Belt are connected to each other (Schneider, 2000).

Significant amounts of rare earth metals are trapped in individual pegmatite swamps some zoned while some are unzoned. The Cape Cross-Uis Belt was the source of tin and tantalite mined by Iscor at Uis from 1958 to 1989 when the mine closed down. In 2019, the Uis Mine was re-opened by AfriTin, Mining. The Karibib Pegmatite is the source of lithium discovered on the MCs of the proponent.

The project site being an arid location is devoid of sources of surface water such as natural lakes, springs, fountains or man-made earth dams. The water for farming applications is sourced from boreholes drilled at different locations of the farms. The average depth for boreholes ranges between 100 m to 150 m and typical yield could be anything between 1 m³ to 2 m³ per hour.

4.4 SOIL ASPECTS

The soil appears to be sandy ranging in colour from reddish to grey with broken calcrete pieces in it, to fine red sand. Judging from the uprooted plants within the mining areas, and the general vegetation outlook over the plains, the soil is quite deep such that the presence of calcrete did not limit the rooting system. Generally, in the semi-arid climate environments, the organic content of soils is usually low and the topsoil poorly developed. However, the densely vegetated woodlands along the banks of the Khan River would suggest that the topsoil is better developed in those sections of the study area.

Good quality tourmalines are found in unconsolidated alluvial sediments ranging in thickness from 0.3 m down to a depth of about 2 m. These deposits are mostly worked by manual labour using pick and shovel.

The second source where semi-precious stones are encountered is in the granitic pegmatite. These rocks are very hard and the use of heavy earthmoving machinery is required to successfully uncover 'pockets' of good quality tourmaline often buried deep down in the pegmatite. SSMs have accumulated practical knowledge and skills of following 'the reef crystal' which leads to the pocket.

4.5 LAND USE, ALTERNATIVES AND OWNERSHIP

Given the semi-arid nature of the area, wildlife ranching is the primary land use on the commercial farm. In terms of the Wildlife Ordinance of 1967, a farmer on freehold land in Namibia is given conditional right to use 'wildlife' on his or her property for recreational hunting. The species allowed for hunting under this law are *Kudus*, *Oryx*, *Common Warthog* and *Springbok*. In addition, landowners could also benefit from wildlife through consumptive use and ecotourism. Types of consumptive use of wildlife permitted in Namibia are:

- 'Shoot and sell' – with this permit a game farmer is allowed to shoot wildlife in order to sell the meat. The hunting period is during July and August each year.
- Safari hunting - this is guided hunting provided, mostly to foreign tourists hunting under the guidance of a professional hunter. Male animals are often hunted for trophy horns, skulls, teeth and or bodies. The safari hunting season normally starts from 1 February to 30 November each year and a farm must be registered as a hunting farm.
- Biltong hunting – this permit allows hunting of non-trophy animals for the production of biltong. Shoot and sell permits can also serve the same purpose. The biltong hunting season is from May to August for perimeter game-fenced farms and June and July for non-game fenced farms.
- Wildlife harvesting – this permit allow culling of wildlife by specialist teams who sell the culled meat on to third parties such as abattoirs or meat processors.
- Live capture and sale – this permit allows capturing of live wildlife for sale to other farmers for restocking, for export to other countries or institutions conducting researches or for breeding purposes.

According to a 2011 survey study titled ' An Analysis of Game Meat Production and wildlife - based Land Uses on Freehold Land in Namibia' by Peter Lindsey, wildlife farming is increasingly becoming popular and a profitable enterprise in the country with approximately 288 000 km² - of freehold land used for wildlife farming in the country. Of these land, about 34 000 km² is used exclusively for game farming. During 2011 Namibia's total beef production was 78 140 tons while game meat was 26 000 kg or 33% of the total meat produced in the country.

As an alternative use, the grazing yield on this farm is considerable low to support full scale beef production. Even with clearing of bush encroachment, grazing yield would still remain marginally inadequate and of low quality for intensive beef production. Cropping is also not feasible given the low and erratic rainfall.

The negative impacts associated with mining activities especially those conducted by small-scale miners are:

- Open trenches which are left unrehabilitated;
- Poor waste management with plastics, bottles and cans strewn around the area,
- Poaching of wild animals which are the lifeblood of a game farm;
- Uncontrolled entry, and
- Poor communication & relationship between farm owners and SSMs

4.6 THE BIODIVERSITY

4.6.1 VEGETATION

From a rangeland perspective the study area would fall under what is referred to as 'Thornbush Savanna' in terms of the agro-ecological zoning map of Namibia. In such an area, the biomass rate is estimated at 510 kg dry mass per hectares. At an average rainfall of 240 mm per year, the area is not suitable for intensive commercial cattle farming. However, small livestock such as sheep, goats and game which are natural browsers than grazers should thrive.

4.6.2 ANIMALS

The information provided under this section is based on desktop studies of available database records, literatures and specialized studies conducted in and around the study area by various specialists, e.g. Griffins (2003) and the National Avifaunal database compiled by Dr Chris Brown.

According to the work of Griffins (2003) there are about 139 species of animal that used to occur and still occur within the wider study area. The species list includes 4 amphibians, 49 reptiles and 66 mammals. Of the total number of species, 56 have been accorded national conservation status. It should be mentioned that the majority of these species have broad regional distributions which include the Erongo and Brandberg mountains.

4.6.3 MAMMALS

Many of the large mammals included on the list such as elephants, lions and rhinos do not occur in the study area any longer but are confined to big conservations which are privately owned (i.e. Erindi Private Game Reserve, etc.) and GRN owned (i.e. Etosha National Park, Waterberg Plateau National Park, Bwabwato National Park, etc.). In general, the dense stands of predominantly thorny bushes has made habitat unsuitable to many grazing mammals. Mammals which survive by hunting such as Cheetahs have also found it difficult to habituate in the areas. Discussions with staff personnel on game farm have mentioned the following animal species as being common on the properties.

Table 9: List of Mammals

<ul style="list-style-type: none"> • Oryx • Greater Kudu • Springbok • Common Eland • Hartebeest • Zebra Hartmann's • Common Warthog • Wildebeest, Blue • Giraffe • Zebra Plains 	<ul style="list-style-type: none"> • Impala, Common • Waterbuck • Sable Antelope • Impala, Black faced • African Ground Squirrel • Bat-eared Fox • Jackal, Black-backed • Wildebeest, Black 	<ul style="list-style-type: none"> • Impala, Common • Waterbuck • Sable Antelope • Impala, Black faced • African Ground Squirrel • Bat-eared Fox • Jackal, Black-backed • Wildebeest, Black
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

In **Table 11**, above, the species highlighted in the last column is Protected Game under the Nature Conservation Ordinance. There are no endemic mammals which occur within the study area or in the wide surroundings. According to the farming staff, leopards have been encountered on the mountain hills at the intersection of Otjakatjongo and Otjimbojo. Leopards in this area will have an important ecological role to play in keeping the population of dassies and baboons from exceeding the carrying capacity of the vegetation.

What appear to pose serious danger to the large mammals within the project site are the numerous open excavations (trenches) left un-rehabilitated by the small scale miners. Some of the trenches are as deep as ten meters. Poaching has been highlighted as a serious problem on the farm on which the MCs are located. This has led to the establishment of an armed response unit based at Karibib which responds to poaching incidents reported to the unit by its members.

4.6.4 REPTILES

Most of the reptiles occurring within and around the study area have developed some form of adaptation skills to surviving in arid conditions. Of the forty nine (49) species of reptiles likely to occur within the study area, four (4) are believed to be endemic to Namibia. These are the *Dwarf Gecko*, *Kalahari Whip Snake*, *Leopard Whip Snake* and *Zebra Snakes*. All four species have a wide distribution throughout Namibia and are unlikely to be affected by the envisaged operation.

According to the farming staff, snakes such as Cobra and Dwarf Python are often encountered within the project site especially on the mountainous hills where they prey on rodents and rats. The Python and Chameleon have legal protection. Due to their slow movement, Chameleons are often killed by vehicles. A number of people are still fascinated to see a chameleon changing its colours.

The banks of the Khan River which runs south of the project site are the natural habitats to many reptiles in the area. Reptiles which utilize rocks as their natural habitats are likely to be impacted by exploration and mining activities.

4.6.5 BIRDS (AVIFAUNA)

Most bird species occurring in Namibia are regarded as highly nomadic which tend to follow rainfall patterns and vegetation growth and availability resulting from such rainfall. In case of large birds, these are generally known to navigate vast tracks of terrain hence reducing their sensitivity to areas of disturbances and conflict. Within the study area, trees and plants around the banks of Khan River are generally green throughout the year and therefore presenting suitable habitats and breeding grounds for birds.

There are no known birds endemic to the study area. Apart from a few pest species and some that are huntable game, most bird species are protected by law in Namibia. The *Lappet Faced Vulture* is classified as vulnerable and therefore protected. This species tends to use the same nest built in large trees year after year. They are known to have large ranges and prone to collision with power lines. Large trees along the Khan River are likely to be suitable for *Lappet Faced Vultures* to build nests in,

but the mining activities are remote from the Khan River and will have no impact.

4.7 THE SOCIO-ECONOMIC ENVIRONMENT

The socio-economic environments discussed under this section are those of the Erongo Region and the town of Karibib. Most of the SSMS have Karibib as their home town and it is also the place where tourmaline trading activities take place.

4.7.1 REGIONAL CONTEXT

According to the Namibia 2011 Population and Housing Census, the Region of Erongo had a population of 150 400 people or 7.1% of the total Namibia population of 2 104 900 people at that time. Over 80% of the population in Erongo live in urban areas while 20% live in rural areas.

4.7.2 CONSTITUENCY CONTEXT

Karibib is the administrative capital for the Karibib Electoral Constituency and had a population of 13 320 during 2011. The population of the town itself was 5 132 with the majority of the residents working on the mines around the town. The Navachab gold mine is the biggest employer in Karibib. Salaries and wages from the farming activities accounted for approximately 6%. Approximately 9% of the population was depended on non-farming and non-mining businesses.

Most small scale miners reside in Karibib; and it is where they spend their disposable incomes i.e. support to their families and friends and payment for services (water, electricity, rates, etc.) to the local authority.

5 ASSESSMENT METHODOLOGY

In line with EMA, a broader definition of 'environment' is adopted, which includes both bio-physical and socio-economic components. The objective of the Environmental Assessment Policy is to seek to achieve a balance between positive and negative impacts, and between bio-physical impacts and social-economic gains to the society.

Hence, both negative and positive impacts on the environment are considered. To the extent that is practically possible, measures to avoid, eliminate or minimise negative impacts are suggested and presented in the EMP. Where positive impacts are derived from the proposed project, measures are suggested to enhance such positive impacts to benefit the broader society.

The assessment has considered the nature and scope of the envisaged exploration activities. The assessment is made based on the current prevailing situation. Should the scope, scale and operational parameters of the project change in any material way, then some of the mitigations as recommended in this EIA will have to be reconsidered.

5.1 ASSESSMENT CRITERIA

The identified impacts have been assessed based on the criteria presented in Tables: 10 and 11?

Table 10: Criteria for Assessing Impacts

<p>Notes:</p> <p>Part A: Provides the definition for determining impact consequence (combining intensity, spatial scale and duration) and impact significance (overall rating of the impact).</p> <p>Part B & C: Impact consequence and significance are determined.</p> <p>Part D: The interpretation of the impact significance is given. (VH = very high, H = high, M=medium, L=low and VL= very low and + denotes a positive impact)</p>

PART A : DEFINITION AND CRITERIA		
Definition of Significance	Significance = Consequence x Probability	
Definition of CONSEQUENCE	Consequence is a Function of Intensity, Spatial Extent and Duration	
Criteria for Ranking of the Intensity of Environmental Impacts	VH	Severe change, disturbance or degradation. Associated with severe consequences. May result in severe illness, injury or even death. Targets, limits threshold of concern continually exceeded. Substantial intervention will be required. Widespread community mobilization against project can be expected. May result in legal action if impact occurs.
	H	Prominent change, disturbance or discomfort. Associated with real and substantial consequences. May result in illness or injury. Targets, limits and thresholds of concern regularly exceeded. Will definitely require intension. Threats of community action. Regular complaints can be expected when the impact takes place. Wi
	M	Moderate change, disturbance or discomfort. Associated with real but not substantial consequences. Targets, limits and threshold of concern may occasionally be exceeded. Likely to require some intension. Occasional complaints can be expected.
	L	Minor (slight) change, disturbance or nuisance. Associated with minor consequences or deterioration. Targets, limits and thresholds of concern regularly exceeded. Require only minor interventions or cleanup actions. Sporadic complainants could be expected.
	VL	Negligible change, disturbance or nuisance. Associated with very minor changes consequences or deterioration. Targets, limits and threshold of concern never exceeded. No interventions or clean-up actions required. No complainants expected.
	VL+	Negligible change or improvement. Almost no benefits. Change not measurable/will remain in current range.
	L+	Minor change or improvement. Minor benefits. Change not measureable/will remain in current range. Few people will experience the benefits.
	M+	Moderate change or improvement. Real but not substantial benefits. Will be within or marginally better than current conditions. Small number of people will experience benefits.
	H+	Prominent change or improvement. Real and substantial benefits. Will be better than current conditions. Many people will experience benefits. General community support.
	VH+	Substantial, large scale change or improvement. Considerable and widespread benefits. Will be much better than current conditions. Favourable publicity and/or widespread support expected.

PART A : DEFINITION AND CRITERIA		
Criteria for ranking the DURATION of Impacts	VL	Very short, always less than a year
	L	Short term, occurs for more than 1 but less than 5 years.
	M	Medium-term, 5 to 10 years.
	H	Long term, between 10 and 20 years. (likely to cease at the end of the operational life of the activity)
	VH	Very long, permanent, over 20 years (Irreversible, beyond closure)
Criteria for ranking the EXTENT of impacts	VL	A portion of the site
	L	While site
	M	Beyond site boundary, affecting immediate neighbours
	H	Local area, extending far beyond site boundary
	VH	Regional or national

PART B: DETERMINING CONSEQUENCE							
INTENSITY = VL							
DURATION	Very long	VH	Medium	Medium	Medium	High	High
	Long term	H	Low	Medium	Medium	Medium	High
	Medium term	M	Low	Low	Medium	Medium	Medium
	Short term	L	Very Low	Low	Low	Medium	Medium
	Very short	VL	Very Low	Low	Low	Low	Medium
INTENSITY = L							
DURATION	Very long	VH	Medium	Medium	High	High	High
	Long term	H	Medium	Medium	Medium	High	High
	Medium term	M	Low	Medium	Medium	Medium	High
	Short term	L	Low	Low	Medium	Medium	Medium
	Very short	VL	Very Low	Low	Low	Medium	Medium
INTENSITY = M							
DURATION	Very long	VH	Medium	High	High	High	Very High
	Long term	H	Medium	Medium	High	High	High
	Medium term	M	Medium	Medium	Medium	High	High
	Short term	L	Low	Medium	Medium	Medium	High
	Very short	VL	Very Low	Low	Medium	Medium	Medium
INTENSITY = H							
DURATION	Very long	VH	High	High	High	Very High	Very High
	Long term	H	Medium	High	High	High	Very High
	Medium term	M	Medium	Medium	High	High	High
	Short term	L	Medium	Medium	Medium	High	High
	Very short	VL	Low	Medium	Medium	Medium	High
INTENSITY = VH							
DURATION	Very long	VH	High	High	Very High	Very High	Very High
	Long term	H	High	High	High	Very High	Very High
	Medium term	M	Medium	High	High	High	Very High
	Short term	L	Medium	Medium	High	High	High
	Very term	VL	Low	Medium	Medium	High	High
			VL	L	M	H	VH
			A section of the site	Entire project site	Beyond the site boundary	Local area, extending beyond site boundary	Regional/ National
EXTENT							

PART C: DETERMINING SIGNIFICANCE							
PROBABILITY (for exposure to Impacts)	Definite	VH	Medium	High	High	Very High	Very High
	Probable	H	Medium	Medium	High	High	Very High
	Possible/ Frequent	M	Low	Medium	Medium	High	High
	Conceivable	L	Low	Low	Medium	Medium	High
	Unlikely/ Improbable	VL	VL	Low	Low	Medium	Medium
			VL	L	M	H	VH
CONSEQUENCE							

PART D: INTERPRETATION OF SIGNIFICANCE		
Significance		Decision Guideline
Very High	Very High+	Represents a key factor in decision making. Adverse impact would be considered a potential flaw unless mitigated to lower significance
High	High+	Beneficial or adverse impacts are considered very important considerations and must have an influence on the decision. In case of adverse impacts, substantial mitigation will be required.
Medium	Medium +	These beneficial or adverse impacts maybe important but are not likely to be considered decision-making factors. In case of adverse impacts, mitigation will be required.
Low	Low+	These beneficial and adverse impacts will not have an influence on the decision. In the case of adverse impacts, limited mitigation is likely to be required.
Very Low	Very Low+	It will not have an influence on the decision. Does not require any mitigation.
Insignificance		Inconsequential, does not merit any consideration

5.2 ADDITIONAL ASSESSMENT CRITERIA

Additional criteria that are taken into consideration in the impact assessment process to further describe the impact and support the interpretation of significance in the impact assessment process are the following:

- the degree to which impacts may cause irreplaceable loss of resources;
- the degree to which impacts can be avoided;
- the degree to which impacts can be reversed;
- the degree to which the impacts can be mitigated; and
- the extent to which cumulative impacts may arise from interaction or combination from other planned activities or projects is tabulated below.

Table 11: Additional Assessment Criteria

Additional Assessment Criteria		
Criteria for DEGREE to which impact can be Reversed	Irreversible	Where the impact cannot be reversed and is permanent
	Partially Reversible	Where the impact can be partially reversed and is temporarily
	Fully Reversible	Where the impact can be completely reversed
Criteria for DEGREE of Irreplaceable Resource Loss	None	Will not cause irreplaceable loss
	Low	Where the activity results in a marginal effect on an irreplaceable resource
	Medium	Where an impact results in a moderate loss, fragmentation or damage to an irreplaceable receptor or resource
	High	Where the activity results in extensive or high proportion of loss, fragmentation or damage to irreplaceable receptor or resource.
Criteria for DEGREE to which Impact can be Avoided	None	Impact cannot be avoided and consideration should be given to compensation and offsets.
	Low	Impact cannot be avoided but can be mitigated to acceptable levels through rehabilitation and restoration.
	Medium	Impact cannot be avoided, but the significance can be reduced through mitigation measures.
	High	Impact can be avoided through the implementation of preventative mitigation measures
Criteria for DEGREE to which Impact can be Mitigated	None	No mitigation is possible or mitigation even if applied would not change the impact
	Low	Some mitigation is possible but will have marginal effect in reducing the impact significance rating
	Medium	Mitigation is feasible and will may reduce the impact significance rating
	High	Mitigation can be easily applied or is considered standard operating practice for the activity and will reduce the impact significance rating.
Criteria for potential for Cumulative Impact	Unlikely	Low likelihood of cumulative impact arising
	Possible	Cumulative impacts with other activities or projects may arise
	Likely	Cumulative impacts with other activities or projects either through interaction or in combination can be expected.

6 IMPACT DESCRIPTION AND ASSESSMENT

In this section, the impacts as identified during the scoping are evaluated and assessed in terms of the methodology outlined in the preceding chapter. The scoping phase identified several risks to the physical, biological (biodiversity) and socio-economic aspects. Initially, a list of risk to each environmental aspect was identified.

Where risks were evaluated as "Insignificant" these were excluded from further assessment. Where impacts pre-mitigation ranged between "Very Low" and "Low" significance, the impacts are evaluated in detail, and mitigation and monitoring measures outlined. No impact with a significance higher than "Low" (i.e Medium, High or Very High) were identified. Recommended mitigation measures and monitoring requirements, regardless of impact significance, are provided in the EMP.

6.1 IMPACTS ON THE PHYSICAL ENVIRONMENT

Potential impacts with respect to the physical environment are presented in **Table 14**.

Table 12: Physical Environmental Aspects

Type of Impact /Aspect	Impact Description	Impact Significance	
		Pre-Mitigation	Post-Mitigation
Climatic change	Contribution of project related GHG emissions to the climatic change	Low	Very Low
	Accidental escape or release of GHG emissions	Low	Very Low
Geology	Risk to geological formations. i.e. drilling triggering earth trem or earth movements	Insignificant	Insignificant
Soil disturbances	Risk to soil through increased soil erosion and compaction	Low	Very Low
	Risk to soil through contamination of harmful products	Low	Very Low
Diminished land use capability	Loss of grass resulting from soil surface disturbances	Very Low	Insignificant
	Diminished grazing capacity due loss of grass and vegetation	Very Low	Insignificant

6.1.1 CLIMATIC CHANGE – PROJECT RELATED GHG EMISSIONS TO CLIMATE CHANGE

Exploration activities will result in minimal GHG emissions which contribute to atmospheric GHG concentrations and climate change. Sources of emissions include the fuel consumption of onsite generators, fuel used by operating truck mounted drill rig, air compressors, miscellaneous equipment and the fuel consumption of supply trucks. Overall, the project-related emissions are expected to be far below the threshold set by the European Bank of Development and therefore classed as very low.

Table 13: Accidental Escape of GHG Emissions

Aspect: Accidental Escape of GHG Emissions		
All Phases – Exploration and Rehabilitation of drilled sites		
Criteria	Without mitigation	With Mitigation
Intensity	N/A	N/A
Duration	N/A	N/A
Extent	N/A	N/A
Consequence	N/A	N/A
Probability	N/A	N/A
Significance	Very Low	Very Low
Additional Assessment Criteria		
Degree to which impact can be reversed	Fully reversible	
Degree to which impact may cause irreplaceable loss of resource	None	
Degree to which impact can be mitigated or avoided	High	
Cumulative Impacts		
Nature of cumulative impacts	Insignificant contribution to global GHG emissions	
Extent to which a cumulative impact may arise	Unlikely	
Rating of cumulative Impacts	Without Mitigation	With Mitigation
	Insignificant	Insignificant
Residual impacts	None	

MITIGATION MEASURES

Measures have been recommended in the EMP.

6.1.2 SOILS AND LAND DISTURBANCE - PHYSICAL IMPACT ON SOILS (INCREASED EROSION /COMPACTION)

The exposure of soils through vegetation clearance and/or physical disturbance of exposed soils may increase the risk of erosion (by wind and water), while the repetitive movement of vehicles and machinery over such surfaces could compact soils. These impacts may collectively affect the surface hydrology, damage soil structure, reduce aeration, soil permeability, infiltration rates and water retention capacity, and retard the regeneration of vegetation. Reduced infiltration could also result in an increase in surface runoff, potentially causing increased sheet, rill, and gully erosion

Table 14: Potential Impacts on Soil

Aspect: Impacts to Soil Through Increased Erosion and Compaction		
All Phases – Exploration and Rehabilitation of drilled sites		
Criteria	Without mitigation	With Mitigation
Intensity	Medium	Low
Duration	Short Term	Short Term
Extent	Beyond Mining Claim	Site Specific (within Mining Claim)
Consequence	Low	Very Low
Probability	Conceivable	Unlikely
Significance	Very Low	Insignificant
Additional Assessment Criteria		
Degree to which impact can be reversed		Fully reversible
Degree to which impact may cause irreplaceable loss of resource		None
Degree to which impact can be mitigated or avoided		High
Cumulative Impacts		
Nature of cumulative impacts	The extent that the addition of exploration activities will have on the overall soil performances	
Extent to which a cumulative impact may arise	Unlikely	
Rating of cumulative Impacts	Without Mitigation	With Mitigation
	Insignificant	Insignificant
Residual impacts	None	

MITIGATION MEASURES

- Site clearing should be undertaken in the dry season so as to minimise the chance of erosion due to run off.
- Land clearing should be undertaken just prior to drilling of a particular activity and unnecessary land disturbance must be avoided. Work areas must be clearly defined and visibly demarcated to avoid disturbance outside of the footprint.
- Vehicle movements must be restricted on prepared roads and off-road driving is strictly prohibited.
- Design site drainage and stormwater runoff to minimise risk of erosion.
- Hazardous substances stored on site should be contained in compatible, appropriately-labelled containers to prevent reaction with containers and possible spillage during handling.
- Relevant training should be provided to all employees or contractors allowed to handle hazardous substances. Keep handling procedure and records of training on site.
- All excess concrete and rubble should be removed from site on completion of any concrete work and disposed appropriately.

RECOMMENDED MONITORING:

- Daily site inspections by the specifically trained employees
- Monthly inspections by the Exploration Manager

6.1.3 SOIL AND DIMINISHED LAND USE CAPABILITY

Exploration drilling requires the use of vehicles and equipment driven by engines using hydrocarbons. Some of the equipment has hydraulic systems with lubricants. Certain hazardous chemicals may also be used and stored on site. Each of these systems can leak and spillages can occur from containers and during refueling. Such materials would contaminate the soils. The overall volumes of the high risk materials on site during drilling is relatively low with no bulk containers (such materials are generally in 210 litres drums or smaller)

Table 15: Impacts from Soil & Diminished Land Use

Aspect: Impacts from Soil and Diminished Land Use Capabilities		
All Phases – Exploration and Rehabilitation of drilled sites		
Criteria	Without mitigation	With Mitigation
Intensity	Medium	Low
Duration	Short Term	Short Term
Extent	Beyond Mining Claim	Site Specific (within Mining Claim)
Consequence	Low	Very Low
Probability	Conceivable	Unlikely
Significance	Very Low	Insignificant
Additional Assessment Criteria		
Degree to which impact can be reversed		Fully reversible
Degree to which impact may cause irreplaceable loss of resource		None
Degree to which impact can be mitigated or avoided		High
Cumulative Impacts		
Nature of cumulative impacts	The exploration activities will take place within an agricultural landscape within which the use of similar equipment is common (i.e. use of tractors, farm vehicles, etc.) hence cumulative impact should be expected.	
Extent to which a cumulative impact may arise	Unlikely	
Rating of cumulative Impacts	Without Mitigation	With Mitigation
	Insignificant	Insignificant
Residual impacts	None	

MITIGATION MEASURES

- Hazardous substances stored on site should be contained in compatible, appropriately-labelled containers to prevent reaction with containers and spillage during handling.
- The relevant MSDS documents should be clearly displayed in the hazardous substance storage area.
- Relevant training should be provided to all employees/contractors on the correct storage and handling procedures and records of this training kept on site.

RECOMMENDED MONITORING

- Daily site inspections by the designated well trained employee
- Monthly inspection by EM

6.2 IMPACTS ON THE BIOLOGICAL / BIODIVERSITY ENVIRONMENT

Assessment of potential impacts on the biodiversity environment are presented.

Table 16: Impacts on the Biodiversity Environment

Type of Impact/Aspect	Impact Description	Impact Significance	
		Pre-Mitigation	Post-Mitigation
Loss of fauna	Loss of and disturbance to vegetation and faunal habitats	Insignificant	Insignificant
Decrease or adverse changes in terrestrial biodiversity	Population of species of conservation concern, disturbance to and mortality of fauna	Insignificant	Insignificant
Decrease in plant diversity	Establishment of alien and invasive species in areas disturbed by exploration activities	Insignificant	Insignificant
	Changes in vegetation structure and plant species composition	Insignificant	Insignificant
Loss of terrestrial ecosystem function	Overall species and ecosystem diversity	Insignificant	Insignificant
	Ecological processes and ecosystem functionality	Insignificant	Insignificant
	Ecological connectivity	Insignificant	Insignificant
	Threatened ecosystem compromised	Insignificant	Insignificant
Impacts on aquatic ecosystem	Direct physical loss or modification of freshwater habitats	Insignificant	Insignificant
	Alteration of hydrological and geomorphological processes	Low	Very Low
	Impacts on water quality	Insignificant	Insignificant
	Ecological connectivity or ecological disturbances	Low	Very Low

6.2.1 AQUATIC ECOLOGY - ALTERATION OF HYDROLOGICAL AND GEOMORPHOLOGICAL PROCESSES

Most of the wetlands in the study area are depressions. Whilst the small depression wetlands in the study area are unlikely to be associated with significant groundwater interactions, the large depression wetlands are expected to be hydrologically linked to groundwater resources. The proposed exploration wells will be drilled to a depth of approximately 500 m. The wells will therefore penetrate shallow and deep aquifers. Whilst the sealed and capped wells will be in place permanently, the localised nature of the interruption of groundwater processes by the drill hole means that the expected intensity of impacts to surface water wetlands because of the interruption is negligible.

Should water-based mud be used as a drilling fluid, this will be contained within a series of waste skips within the vicinity of the drill site. The distance of each drill site from the study area wetlands means that it is unlikely that expelled fluid will impact upon watercourse hydrological regimes. Rather, discharged liquid is likely to infiltrate into the soil profile and move downslope away from the selected sites in a diffuse manner. Overall, the operation phase impact significance rating is 'Very Low

Table 17: Alteration of Hydrological & Geomorphological Process

Aspect: Alteration of Hydrological and Geomorphological Process		
Phase – Exploration drilling only		
Criteria	Without mitigation	With Mitigation
Intensity	Negligible	Negligible
Duration	Permanent	Permanent
Extent	Site	Site
Consequence	Low	Very Low
Probability	Conceivable	Conceivable
Significance	Low	Very Low
Additional Assessment Criteria		
Degree to which impact can be reversed		Irreversible
Degree to which impact may cause irreplaceable loss of resource		None
Degree to which impact can be mitigated or avoided		None
Cumulative Impacts		
Nature of cumulative impacts	The project site is in an area in which mineral prospecting and exploration activities have been conducted in the past. However, there is no recorded history of exploration drilling having taken place on the same farm. The predominant farming activities performed in the project area is livestock and game farming. Irrigation of cropping fields is known to cause impacts to watercourse hydrological and geomorphological processes. Due to limited water resources, irrigation is not practiced. The drilling of any core holes is unlikely to cause any notable alterations to watercourse hydrological and geomorphological processes. Hence cumulative impacts are non-existent in the overall project area.	
Extent to which a cumulative impact may arise	Unlikely	
Rating of cumulative Impacts	Without Mitigation	With Mitigation
	Insignificant	Insignificant
Residual impacts	None	

MITIGATION MEASURES

Comply with the EMP

6.2.2 ECOLOGICAL CONNECTIVITY AND/OR ECOLOGICAL DISTURBANCES

During the drilling operation, the presence of personnel, machinery and equipment in the vicinity of onsite watercourses has the possibility to generate noise, vibrations and dust which have the potential to temporarily disturb and displace fauna that make use of watercourses for refuge. In fact, the actual drill rig operation will be associated with significant temporary noise and vibrations. Faunal species that could be disturbed in nearby watercourses are likely to include amphibians, reptiles, birds, and small mammals. The presence and operation of the drill sites is however temporary with any dispersed fauna likely to return to the vicinity of the drill sites once well testing and logging is complete, and the drill contractor has moved off site.

It is likely that areas where equipment and mobile infrastructure have been stored at the drill sites will be colonised by pioneer vegetation species including some invasive aliens. However, these can be easily cleared and controlled. The overall operation phase ecological connectivity / disturbance impact significance is therefore very low

Table 18: Ecological Connectivity and Ecological Disturbances

Aspect: Ecological Connectivity and /or Ecological Disturbances		
Phase – Exploration and collection of samples		
Criteria	Without mitigation	With Mitigation
Intensity	Negligible	Negligible
Duration	Very short term	Very short term
Extent	Site	Site
Consequence	Low	Very Low
Probability	Conceivable	Conceivable
Significance	Low	Very Low
Additional Assessment Criteria		
Degree to which impact can be reversed		Fully reversible
Degree to which impact may cause irreplaceable loss of resource		None
Degree to which impact can be mitigated or avoided		Low
Cumulative Impacts		
Nature of cumulative impacts	The establishment of exploration sites is unlikely to cause permanent ecological disturbances. The project site is therefore not associated with the cumulative impacts of this nature.	
Extent to which a cumulative impact may arise	Unlikely	
Rating of cumulative Impacts	Without Mitigation	With Mitigation
	Insignificant	Insignificant
Residual impacts	None	

MITIGATION MEASURES

- Prohibit poaching or collection of plants and biota during the operational (drilling phase).
- Rehabilitate any erosion or vegetation clearing impacts as soon as practically possible.
- Temporary noise pollution should be minimized where possible.

MONITORING

- Daily site inspections during exploration activities
- Monthly inspections by the EM

6.2.3 IMPACTS ON SOCIAL AND SOCIO-ECONOMIC ENVIRONMENT

Potential risks to the social and socio-economic aspects are listed in Table 17.

Table 19: Impacts on Socio-economic Environments

Type of Impact/Aspect	Impact Description	Impact Significance	
		Pre-Mitigation	Post-Mitigation
Social	Risk to land use	Insignificant	Insignificant
	Risk to public safety	Insignificant	Insignificant
	Farm safety and security	Insignificant	Insignificant
	Risk from veld fires	Insignificant	Insignificant
	Impacts on air quality due to dust	Insignificant	Insignificant
	Noise impacting neighbouring properties	Insignificant	Insignificant
Socio-economic	Disruptions of farming /agricultural activities	Very Low	Insignificant
	Employment & skills transfer	Insignificant	Insignificant
Groundwater	Contamination of groundwater sources	Low	Very Low
	Reduction in groundwater availability	Low	Very Low
Surface water	Contamination of surface water (spills, leaks, etc.)	Low	Very Low
	Increased sediment loads affecting water quality	Low	Very Low
Heritage and Cultural Resources	Destruction or damage to previously unidentified archaeological items	Low	Insignificant
	Destruction of fossils that may be present on the exploration drill sites	Very Low	Insignificant

6.3 **SOCIO-ECONOMIC - DISRUPTION OF FARMING /AGRICULTURAL OPERATIONS**

The MC is located on a commercial farm where farming activities (rearing of livestock and game) are being performed. The exploration sites identified for drilling core holes are on the pegmatite outcropping on hill where vegetation and grass growth is relatively poor. There is therefore potential for conflicting land use to arise resulting in a nominal impact on farming production activities, and by extension, income generation. Despite the probability of an impact occurring, the extent of any exploration impact resulting from exploration activities will be limited to one single farming production season.

Table 20: Disruption of Farming Operations

Aspect: Disruption of Farming /Agricultural Operations		
Phase – Exploration and collection of samples		
Criteria	Without Mitigation	With Mitigation
Intensity	Very Low	Very Low
Duration	Short term	Short term
Extent	Mine Claim Site	Exploration Site only
Consequence	Low	Very Low
Probability	Probable	Improbable
Significance	Very Low	Insignificant
Additional Assessment Criteria		
Degree to which impact can be reversed		Fully reversible
Degree to which impact may cause irreplaceable loss of resource		Low
Degree to which impact can be mitigated or avoided		High
Cumulative Impacts		
Nature of cumulative impacts	Cumulative impact may result if more than one drill rigs are allowed to operate on one MC which is quite a small area – 15 ha.	
Extent to which a cumulative impact may arise	The use of multiple drill rigs will increase the potential for an impact of low significance occurring.	
Rating of cumulative Impacts	Without Mitigation	With Mitigation
	Low	Very Low
Residual impacts	None	

MITIGATION MEASURES

- The location, size and timing of any exploration drilling should be done to minimise disturbances to the farming productivity areas.
- Any siting of a drill site for exploration will have to be through an access agreement negotiated between the exploration right holder and the land owner/occupier. The land owner will thus have a direct say in where the exploration drill site is placed or not placed.
- Where interference with farming activities cannot be avoided then compensation will have to be paid based on the current agricultural rates as agreed with the land owner/operator.
- All drill sites must be rehabilitated to ensure that there are no long-term effects on farming operations.

MONITORING

Comply with the EMP and the conditions attached to the ECC once granted.

6.3.1 **SOCIAL – FARM SAFETY & SECURITY**

Access without permission, poaching and security concerns (of stock theft and personal safety) are very real problems on farms in the Karibib district. The access created by exploration drilling and the many people coming and going from the site could provide opportunity and cover for criminals. The impact if a security occurred in such circumstances would be of high significance.

Concerns regarding site access, trespassing and farm security as a result of the drilling crew being on private land will be alleviated by developing relationships with individual neighbouring farm owners.

Table 21: Farm Security & Security

Aspect: Farm Safety and Security		
Phases – Exploration and Rehabilitation		
Criteria	Without Mitigation	With Mitigation
Intensity	Low	Very Low
Duration	Short term	Short term
Extent	Beyond the Ming Claim	Mining Claim only
Consequence	Medium	Medium
Probability	Conceivable	Unlikely
Significance	Very Low	Insignificant
Additional Assessment Criteria		
Degree to which impact can be reversed		Fully reversible
Degree to which impact may cause irreplaceable loss of resource		Low
Degree to which impact can be mitigated or avoided		High
Cumulative Impacts		
Nature of cumulative impacts	Crime and criminal activities are becoming inherently common in our society.	
Extent to which a cumulative impact may arise	In the event of exploration activities occurring on neighbouring farms, the cumulative impacts have the likelihood to ensue.	
Rating of cumulative Impacts	Without Mitigation	With Mitigation
	Low	Insignificant
Residual impacts	None	

MITIGATION MEASURES

- All access to land for exploration activities will have to be through an access agreement negotiated between the MCH and the land owner/Farm Manager.
- The landowner has proposed that the main contractor hired to carry out exploration work must be in possession of police clearance certificate
- It is recommended that all exploration personnel carry identification cards which can be produced on request.
- Exploration personnel must report unknown persons on the farm to the land owner.
- Where appropriate the access points to a farm must be fitted with locks and these gates must be kept in the status as agreed with the land owner.
- Exploration personnel must contribute positively to security on the farm by informing the land owner of their activity schedules and reporting any suspicious activity to the land owner

6.3.2 GROUNDWATER CONTAMINATION

Groundwater is a critical resources in the Karibib district because the rural communities and commercial farmers are depended on such water for domestic and farming uses. Any changes to the quality of water in the near-surface acquirers has therefore the potential to affect the livelihood of the community.

Impacts to groundwater could potentially result through the process of drilling the proposed exploration drill holes, contamination from decant from deeper aquifer or from incidental risks such as hazardous substance spills (leaks from standing plants, poor vehicle and machinery maintenance practices, sanitation facility leaks, spills during refuelling) and major events.

During the drilling process, drilling fluids such as compressed air or muds are pumped down the inside of the drill pipe and exit at the drill bit to optimise drilling operations. The drilling fluids will mix with ground water encountered down the hole until such time as the hole is grouted. The upper aquifers will be exposed to the drilling fluids for the shortest periods as the hole is cased and grouted early in the drilling process. The assessment concludes that the drilling fluids are not very likely to have a significant effect on groundwater quality because:

- The drilling additives used are largely non-hazardous and/or are bio-degradable;
- The drilling additives are diluted in the drilling water;
- Fluids are designed to not move far from the drilling hole unless very poor formations or large cracks are encountered;
- A 'mudcake' of drill cuttings seals most of the drilled formations even during drilling;
- Drilling fluids are only used for a short period while the hole is being drilled; and
- The total volume of drilling fluids is very small in comparison with any aquifer volume.

The drilling of the exploration drill holes creates a conduit that potentially connects the shallower strata

nearer the surface to the deepest strata. Small quantities of groundwater in different aquifers may flow via this conduit from one aquifer to another, potentially affecting the quality of water in these aquifers. The upper section of exploration drill holes includes a casing and grouting which restrict interaction between these aquifers.

Table 22: Groundwater Contamination

Aspect: Groundwater Contamination		
Phase – Exploration only		
Criteria	Without Mitigation	With Mitigation
Intensity	Moderate	Low
Duration	Short term	Short term
Extent	Beyond MC	Within MC
Consequence	Low	Low
Probability	Probable	Possible
Significance	Low	Low
Additional Assessment Criteria		
Degree to which impact can be reversed		Medium
Degree to which impact may cause irreplaceable loss of resource		Low
Degree to which impact can be mitigated or avoided		High
Cumulative Impacts		
Nature of cumulative impacts	Existing land uses practices and uses (farming) can result in contamination from incidental spillage as well as contamination from inappropriate use of farming chemicals. Cumulative impact may arise from several drilling rigs operating on one mining claim.	
Extent to which a cumulative impact may arise	Exploration using multiple drill rigs on the mining claim increases the potential for cumulative of Low Significance occurring.	
Rating of cumulative Impacts	Without Mitigation	With Mitigation
	Low	Low
Residual impacts	While best practice may be employed with respect to handling and storing of hazardous substances used in the exploration operation, there is always a residual risk of an emergency situation or incident which could occur.	

MITIGATION MEASURES

- Sanitation facilities are to be installed more than 100 m from any sensitive areas such as dry river channels or water boreholes;
- Sanitation facilities are to be sufficiently secured such that they cannot be blown over by wind or knocked over;
- Sanitation facilities are to be serviced regularly and safe disposal certificates obtained and retained on file;
- All vehicles, machinery and equipment is to be maintained in correct operating conditions as per the manufacturers specification;
- No washing of vehicles machinery or equipment is permitted within the drill sites;
- No spillage of hydrocarbons (petroleum, diesel, hydraulic fluids or oils) or chemicals is permitted.
- Drip trays are to be utilised under vehicles or earth moving equipment when not in use.
- Storage and use of chemicals and hydrocarbons may only take place on impermeable surfaces with bunds to contain any accidental spills.
- All spills, including contaminated soils, are to be recovered immediately and managed as hazardous waste.
- A designated representative is to be trained in the use of an emergency spill kit. Emergency spill kits are to be provided at all drill sites;
- Designated waste receptacles for general waste and hazardous waste are to be provided.
- Receptacles are to be stored under a roof or lids provided to prevent windblown litter and rain water entering;
- Sufficient waste storage capacity is to be maintained at all times.
- Safe disposal certificates are to be recorded confirming the appropriate disposal of all hazardous waste;
- Collection, transportation and disposal of all hazardous waste is to be done by an appropriately licensed waste service provider.

- Drilled core holes are to be appropriately cased and grouted. The integrity of the case and grouting to be verified.
- The specific types of drilling additives used must be recorded and Safety Datasheets (SDS) must be available for all drilling chemicals.
- The exploration contractor must use the minimum volume of drilling additives required and must record the daily use of drilling additives and drilling water.

MONITORING:

- Drill site to be inspected daily by supervisor
- Monthly inspection by the Exploration Manager
- Exploration sites must be monitored before exploration starts, during exploration and at least quarterly after post rehabilitation.

6.3.3 GROUNDWATER – REDUCTION IN GROUNDWATER RESOURCE AVAILABILITY

As indicated in the foregone section on groundwater quality, the operation is very small and site specific for it to have any impacts that will result in the diminishing resource of groundwater resources and its availability. It is important that exploration drill holes are sited away from any known active boreholes on the farm.

Table 23: Reduction in Groundwater Resource Availability

Aspect: Reduction in Groundwater Resource Availability		
Phase – Exploration only		
Criteria	Without Mitigation	With Mitigation
Intensity	Moderate	Low
Duration	Short term	Short term
Extent	Beyond MC	Within MC
Consequence	Low	Low
Probability	Probable	Possible
Significance	Low	Low
Additional Assessment Criteria		
Degree to which impact can be reversed		Medium
Degree to which impact may cause irreplaceable loss of resource		Low
Degree to which impact can be mitigated or avoided		High
Cumulative Impacts		
Nature of cumulative impacts	Existing land uses practices and uses (farming) can result in contamination from incidental spillage as well as contamination from inappropriate use of farming chemicals. Cumulative impact may arise from two or more drilling rigs operating on the mining claim.	
Extent to which a cumulative impact may arise	Exploration using multiple drill rigs on the mining claim increases the potential for cumulative of Low Significance occurring.	
Rating of cumulative Impacts	Without Mitigation	With Mitigation
	Low	Low
Residual impacts	While best practice may be employed with respect to handling and storing of hazardous substances used in the exploration operation, there is always a residual risk of an emergency situation or incident which could occur.	

MITIGATION MEASURES

- All drill sites must be located at least 100 m from a watercourse thus lowering the exposure risk.
- Contamination of surface water by hydrocarbon or chemical products should be prevented.
- Oils, greases and drilling fluids (or water contaminated with any of these) may not be released into the environment.
- Storage and use of chemicals hydrocarbons may only take place on impermeable surfaces with bunds to contain any accidental spills.
- Drip trays and or impermeable surfaces with bunds must be placed under machinery that could leak.
- All drilling fluids must be contained in skip receptacles. The sumps should operate at a level to prevent overflows and be bunded to prevent inflow of clean surface water.

- Mobile chemical toilets must be supplied unless access to a built-facility can be negotiated. The chemical toilet must be located more than 100 m from a watercourse. All toilets must be serviced by a reputable service provider and records of safe disposal provided.
- An Emergency Spill Procedure must be developed and the necessary equipment available to implement a response. Any spillages must be recorded as environmental incidents.
- Spillages should be cleaned up and the affected area remediated with a suitable product.
- Any wastes, spent clean up equipment, or remaining contaminated materials must be disposed as hazardous wastes.

MONITORING

On-going monitoring of surface water resources downstream of drilling sites is required before, during and after drilling. The monitoring should take place prior to exploration, quarterly during exploration and for at least one quarter after the site is closed. If a significant decline in water quality is detected then further work must be undertaken to determine the cause and remedial measures.

6.3.4 HERITAGE – ARCHAEOLOGICAL, CULTURAL, AND HISTORICAL IMPACTS

Many farms and communities in rural areas have graveyards located near to the dwellings. There are also many buildings, infrastructure and sites of cultural or heritage importance across the district of Karibib dating from the period when Germans were in control of the territory of Namibia. During mobilization and drilling operations, there is a chance of uncovering cultural artifacts that could be salvaged. Even though the construction of infrastructure and facilities around the site can cause significant disruption, the boreholes can serve as a glimpse into the past, and it may be feasible to recover some of the data and materials

Table 24: Destruction or Damage to Archaeological and Historical Resources

Aspect: Destruction or Damages to Archaeological and Historical Resources		
All phases - Exploration and Rehabilitation		
Criteria	Without Mitigation	With Mitigation
Intensity	Low	Very Low
Duration	Permanent	Permanent
Extent	Site	Site
Consequence	Medium	Low
Probability	Conceivable	Improbable
Significance	Low	Low
Additional Assessment Criteria		
Degree to which impact can be reversed		Low
Degree to which impact may cause irreplaceable loss of resource		Low
Degree to which impact can be mitigated or avoided		Low
Cumulative Impacts		
Nature of cumulative impacts	The extent that the addition of the project will have on the overall impact of developments in the region on heritage resources.	
Extent to which a cumulative impact may arise	Unlikely. Mitigation measures have been proposed in the EMP.	
Rating of cumulative Impacts	Without Mitigation	With Mitigation
	Insignificant	Insignificant
Residual impacts	Due to the nature of heritage resources, subsurface artefact deposits are possible and can be exposed during the construction activities. If the recommended measures are implemented, any findings of cultural nature can be safeguarded and successfully retrieved with minimal destruction.	

MITIGATION MEASURES

While the exploration drill sites are located more than 100 m away from any cultural heritage resource (burial ground, structures, farm equipment, boundary markers), there remains a residual “ Very Low” risk that resources may be unearthed during exploration. A chance find protocol is included in the EMP for guidance should an artefact be discovered.

6.3.5 HERITAGE - PALEONTOLOGICAL IMPACTS

Potential destruction of fossils that might be present in the drill site and laydown area.

Table 25: Destruction of Fossils

Aspect: Destruction of Fossils that may be Present in the Drill Sites and Laydown Areas		
All phases - Exploration and Rehabilitation		
Criteria	Without Mitigation	With Mitigation
Intensity	High	Low
Duration	Permanent	Permanent
Extent	Site	Site
Consequence	Medium	Low
Probability	Conceivable	Unlikely
Significance	Low	Insignificant
Additional Assessment Criteria		
Degree to which impact can be reversed		Irreversible
Degree to which impact may cause irreplaceable loss of resource		Fossils are irreplaceable. However, the implementation of a 'chance find' will safeguard safe retrieval for documentation.
Degree to which impact can be mitigated or avoided		High
Cumulative Impacts		
Nature of cumulative impacts	General loss of fossils and scientific to national knowledge to NHC records.	
Extent to which a cumulative impact may arise	Negligible because each exploration site is unique.	
Rating of cumulative Impacts	Without Mitigation	With Mitigation
	Insignificant	Insignificant
Residual impacts	None. With mitigation (removal of any fossil encountered), the impact will be insignificant.	

MITIGATION MEASURES

- Implementation of a fossil chance find protocol which is included in the EMP.
- If fossils are found by the contractor, the Exploration Manager must be called to the site and a paleontologist or geologist called to assess and collect a representative sample.
- The site should be protected and secured until sample results have been received and directives provided by NHC.

MONITORING

- While logging, the geologist should search for fossil plants remains in the shales and attempt to photograph and recover them, although it is unlikely that any complete fossils will be retrieved given the 135 mm diameter of the core and the maximum drill hole depth of 100 m.
- The fossil heritage within the development footprint could be affected by surface activities due to the nature of the project.

6.3.6 THE 'NO-GO ALTERNATIVE' IMPACTS

- The 'no-go' alternative is the non-occurrence of the proposed exploration activities. The potential positive implications of not going ahead with the proposed exploration are:
- No impacts resulting from the proposed intrusive exploration would occur within the MC area as presented in the foregone sections.
- No (reduced) chance of any risks arising from further exploration or future production.

The potential negative implications of foregoing the proposed exploration are as follows:

- Namibia would lose the opportunity to further establish the extent of BRMG and IMG in the Karibib district.
- Lost economic opportunities related to sunken costs (i.e. costs already incurred) of initial desktop investigations in the proposed exploration area,
- If economic BRMG and IMG reserves do exist on the MC and are not developed, then the promoter would lose the opportunity to exploit such miners resources for its own benefits and, by extension, that of the country.

As noted in the Need and Desirability section, there is a drive from GRN to stimulate the development and grow the economy of Namibia. In order to facilitate this economic growth, there is a need to diversify economic activities. This project is targeting the exploration of those minerals that are vital for transition to a green economy.

No environmental or social fatal flaws have been identified as part of this scoping assessment process. Where impacts have been identified, the significance of these has been limited (Insignificant to Low) and where necessary measures to mitigate, manage and monitor these impact can be undertaken.

6.3.7 CUMULATIVE IMPACTS

Cumulative impacts relates to the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with the activity when added to existing and reasonably foreseeable impacts from other activities.

Given that the assessed impacts of the proposed exploration on MC-70725 are considered to be of Insignificant to Low significance, there is a limited, if any, possibility of a cumulative impacts of any significance resulting.

The various EPLs and MCs granted by MME in the district of Karibib and mining operations that are currently active and those in developmental stages in the same locality could jointly result in cumulative impacts if recommended management measures are not implemented. The nature, scale and duration of exploration activities in the context of large and widespread application areas, is such that a detectable cumulative impact is considered very unlikely.

7 CONCLUSION AND RECOMMENDATION

7.1 CONCLUSION

The key principles of sustainability, including ecological integrity, economic efficiency, and equity and social justice, are summarised below as part of the supporting rationale for venturing an opinion on whether the proposed project should be approved or not.

7.1.1 ECOLOGICAL INTEGRITY

It is the opinion of the EIA Consultant that the amendment to the ECC and updating of the EMP to allow for the proposed exploration operation on MC-70725 would have limited (Insignificant to Low) impacts on the ecology, biodiversity or conservation status of any habitats or species within the MC area.

7.1.2 ECONOMIC EFFICIENCY

The proposed exploration operations on MC-70725 as proposed by the MCH would have no direct impact on any aspect of the economy both at local and national level. However, this can change significantly, if the exploration leads to a discovery of a mineral deposit of the size and scale that it can be mined economically. There are several working mines in the Karibib district to support this expectation.

7.1.3 EQUITY AND SOCIAL JUSTICE

The required amendment to the ECC and upgrading of the EMP to allow for exploration activities on MC-70725 as desired by the promoter would have no direct impact on any social aspect within the mining claimed area or beyond.

Based on the sustainability criteria presented in the preceding paragraphs, the nature and extent of the exploration operations envisaged to take place on MC-70725 with a footprint of 15 ha, it is the conclusion of Ekwao Consulting that, the generally Low, Very Low and Insignificant assessment of impacts, should support a positive decision made by the Environmental Commissioner to amend the ECC originally granted to the proponent.

7.2 RECOMMENDATIONS

Based on the findings of the environmental scoping assessment, it is recommended that an ECC originally granted to Mr Jeano Foelscher (proponent) be amended to allow for the exploration of BRMG and IMG on MC-70725. These terms and conditions may be attached to the ECC, in addition to any other terms and conditions which the EC may wish to attach:

- The general terms and conditions attached to MC-70725 by the Mining Commissioner are to be complied with including reporting requirements as provided for by the Minerals Act.
- The mining of SPS on MC-70725 should be allowed to continue, provided such activities do not interfere with the proposed exploration operations.
- In the event the proposed exploration confirms the presence of a mineral deposit on MC-7072 and the mineral deposit so discovered is of a nature, size and scale that it can be mined economically, a detailed EIA has to be made prior to any mining operations taking place on MC-70725 for any other minerals other than SPS.
- Disturbances resulting from exploration activities must be adequately addressed by rehabilitating all impacted areas to conditions similar to pre-exploration conditions and to satisfaction of the landowner.

REFERENCES:

- ✓ **Lithium**, BGS, July 2016
 - ✓ **Lithium Potential in Namibia, Evaluation of Economic Suitability**, Bundesamt für Geowissenschaften und Rohstoffe, by Michael Schmidt, 2020 Opportunities
 - ✓ **Best Guide Practices – Environmental Principles for Mining in Namibia**, A Joint Publication Proudly published by Chamber of Mines of Namibia (CoM), Namibia Chamber of Environments (NCE), the Namibian Government and Members of the Namibian Mining Industry
 - ✓ **Linning K**, Economic Geology Series. Open File Report EG 070, Geological Report on the Cape Cross Salt Pan, 1965, Geological Survey of Namibia, Ministry of Mines and Energy
 - ✓ **Small Scale Mining and Sustainable Development within the SADC Region**, August 2001, Bernd Dreschlar
 - ✓ **An Artisanal Mining Environmental Code of Practice for Namibia**
 - January 2011
 - Rosina Ndahafa & Morgan Hauptfleisch
 - ✓ **An Analysis of Game Meat Production and wildlife-based Land Uses on Freehold Land in Namibia** by Peter Lindsey,
 - ✓ **Small Scale Mining and its Impacts on Poverty in Namibia. A case study of Miners in Erongo Region of Namibia**
 - December 2009
 - Jacob Nyambe & Taimi Aumunkete
 - ✓ **Adshead, Samuel AM** : Salt and Civilisation, MacMillan, 1992
 - ✓ **Lac Business Group Inc.** Salt Technology & Engineering, RR 3-79 Marple Road, Dalton
<http://www.lacsolarsalt.com/Brochure-08.pdf>
 - ✓ **Veld Management Principles and Practices**
 - Fritz Van Oudetshoorn
 - ✓ **Namibia's 5th National Development Plan (NDP 5) 2017/18 - 2021/22**
 - ✓ **NDP 5 - GRN Portal** – Erongo Regional Council
 - ✓ **National Planning Commission (NPC) 2011: Population and Housing Census Erongo Region**, Windhoek, Government Press
 - ✓ **Chamber of Mines of Namibia**, Annual Reports for 2016, 2017 & 2018
 - ✓ **Interventions for Ensuring the Sustainability of the Small Scale Mining Sector in Namibia**
 - Harmony K. Musiyarira*, Ditend Tesh, Mallikarjun Pillalamarry and Nikowa Namate
 - Department of Mineral and Process Engineering, Namibia University of Science and Technology, Windhoek, Namibia
 - ✓ **BERRY HH** 1975. History of the Guano Platform on Bird Rock, Walvis Bay, South West Africa. Bokmakierie 27: 60-64.
 - ✓ **CRAWFORD RJM, COOPER J, SHELTON PA** 1981. The Breeding Population of White Pelicans *Pelecanus Onocrotalus* at Bird Rock Platform in Walvis Bay, 1947-1978. Fisheries Bulletin of South Africa
 - ✓ **Boorman M** (2011) Unpublished data of ephemeral wetland counts in 2011.
-

- **Coastal Environment Trust of Namibia (CETN)** (2012) Unpublished data of Walvis Bay counts in 2011.
- **Simmons R** 1992. The status of coastal wetlands in Namibia. Matiza T, Chabwela HN (eds) Wetlands conservation conference for southern Africa. Gland: IUCN: 125-132.
- **Underhill LG, Whitelaw DA** 1977. An ornithological expedition to the Namib coast. Cape Town: Western Cape Wader Study Group: 1-106.
- **Williams AJ** 1991. Numbers and conservation importance of coastal birds at the Cape Cross lagoons, Namibia. Madoqua
- **Stauth, R.** (1983) *Environmental Economics* in Fuggle, R.F. and Rabie M.A. (1983)
- **Mendelsohn J, Jarvis A, Roberts C and Robertson T** (2002) Atlas of Namibia. Published for the Ministry of Environment & Tourism by David Philip.
- **Kinahan, J.** (2012) Archaeological Guidelines for Exploration & Mining in the Namib Desert.
- ✓ **AREVA Resources.** Retrieved from www.aveva.com Bitter A (2010) Ground Water Specialist Report to the EIA: Improved water supply to the Langer Heinrich Mine