Scoping Assessment Report

Prepared to Support an Application for an Environmental Clearance Certificate (ECC) to Allow for Exploration and Mining of Industrial Mineral Groups on Mining Claims with these Numbers: MC-67923, MC-67921, MC-68561 & MC-68562

Omaruru District, Erongo Region

August 2023

INFORMATION SHEET		
Project Title Name	:	A Scoping Assessment Report Prepared in Support of an Application of Environmental Clearance Certificate (ECC) to Allow for Exploration and Mining of Industrial Minerals on Four Mining Claims with these Numbers: **MC-67922 to MC-67923 & MC-68561 to MC-68562** Omaruru District, Erongo Region
MEFT Application No.	:	APP-002314
Applicant	:	Mr Jeano Foelscher Box 67 KARIBIB Erongo Region Namibia
Report Status	:	Final
Report Date	:	August 2023

EXECUTIVE SUMMARY

INTRODUCTION

Mr Jeano Foelscher is a small-scale miner (SSM) who holds four mining claims (MCs) pegged on a commercial farm in the Karibib-Omaruru-Wilhelmstal triangle in the magisterial district of Omaruru. The MCs have been registered and granted to the SSM in terms of the Minerals (Prospecting and Mining) Act which is administered by the Ministry of Mines and Energy (MME).

These numbers have been designated to the four MCs viz. MC-68561, MC-68562, MC-67922 and MC-67923. The minerals allowed to be extracted from the MCs are semi-precious stones (SPS) which includes tourmalines, amethyst, aquamarine, quartz, silver topaz and garnets. Historically, SPS has been mined for many years in the aforesaid triangle are found in pegmatite rocks, locally referred to as the Karibib Pegmatite Belt (KPB). The promoter has been mining SPS from the same MCs since 2007 – a period of 17 years.

ENVIRONMENTAL CLEARANCE CERTIFICATE

Mining of SPS from the four MCs has been permitted in terms of the Environmental Management Act and Environmental Impact Assessment Regulations in that an Environmental Clearance Certificate (ECC) has been granted to the promoter. The current ECC will expire on 14 September 2025.

RATIONALE TO AMEND THE ECC

During the course of SPS mining on the same MCs, the SSM has discovered traces of Industrial Mineral Group (IMG) which assayed relatively good grades of tin (Sn), tantalite (Ta_2O_6) and Lithium (Li) that warrant further investigation. The SSM would like IMG included on his Mining Claim Certificate (MCC) in order to allow him to undertake intensive exploration with the objective to enhance the understanding of the IMG mineralisation on the four MCs.

In this connection, Ekwao Consulting was appointed to attend to the environmental requirements of the project.

EXPLORATION FOOTPRINT

The particulars of the four MCs are as presented in the table below. The geographical area covered by the four MCs is 70.21 ha. The proposed exploration activities will be confined to the same MCs and will have a footprint of about 1 ha per MC. The plan entails drilling ten diamond core boreholes per MC down to depths of between 100 and 150 m extracting a core of 75 mm in diameter. It has been assumed that one core borehole will take between two and three weeks which results in the project having a duration of about 80 weeks – two years.

MC Registered No.	Date MC Pegged	Current MC Status	Coverage (ha)	Current Mineral Group	Proposed Mineral Group
MC-67922	4 Oct 2007	Pending Renewal	15.22	SPS	IMG
MC-67923	4 Oct 2007	Pending Renewal	19.53	SPS	IMG
MC-68561	27 Oct 2010	Pending Renewal	18.51	SPS	IMG
MC-687562	27 Oct 2010	Pending Renewal	17.70	SPS	IMG
Total (ha)			**70.21**		
Exploration Core Drill Hole Footprint (5.70%)			**4**		
Estimated potential mining footprint – 60%			**42**	Exact footprint will be determined after exploration	

POTENTIAL IMPACTS

The scoping assessment has identified that the project will have minimal impacts on the receiving environment because:

- The establishment of project support infrastructure (maintenance yard, ablution facilities, etc.) will be located on disturbed areas within each mining claim.
- Existing internal routes will be used as far as possible with no new routes established or constructed.
- Most of the vegetation has been cleared during SPS mining operations, but faunal habitats that may have re-established post-mining may be impacted during exploration.
- Potential contamination of both surface and groundwater sources may occur from poor handling, inadequate storage, spills and or leaks of hazardous products. Sewerage from poor maintenance of ablution facilities could also be a potential health hazard. However, these impacts can be effectively mitigated if the management measures as recommended in the EMP are implemented.
- Uncontrolled access to the work site on farm and ill-discipline of personnel (employees) could lead to illicit activities such as hunting down of wildlife on the farm (poaching) and or chopping down trees in order to harvest firewood for cooking purposes.
- Availability of water has been identified as a big challenge. The boreholes sunk on the farm do not yield enough water for the farming operation and the promoter has therefore two options - to cart water either from Omaruru / Karibib or to drill an own borehole on the farm.

CONCLUSION

The impacts associated with the proposed exploration activities that the promoter intends to carry out on his four Mining Claims can be effectively minimised if not completely avoided, if the mitigation measures presented in the EMP are complied with.

TABLE OF CONTENT

TABLES

FIGURES

ABBREVIATIONS AND ACRONYMS

BAT	-	Best Available Technology
CapEx	-	Capital Expenditure
dBA	-	Decibels
DSO	-	Direct Shipping Ore
EC	-	Environmental Commissioner
ECC	-	Environmental Clearance Certificate
EIA	-	Environmental Impact Assessment
EMA	-	Environmental Management Act
EMP	-	Environmental Management Plan
MRMG	-	Base and Rare Metal Group
FM	-	Farm Manager
GPS	-	Global Positioning System
GRN	-	Government of the Republic of Namibia
ha	-	hectare (1 ha = 10 000 m^2)
HPP	-	Harambee Prosperity Plan
IAPs	-	Interested and Affected Parties
IMG	-	Industrial Mineral Group
Li	-	Lithium
Li_2O	-	Lithium Oxide
LDV	-	Light Duty Vehicle
m^2	-	square meters
MA	-	Minerals Act
MAWLR	-	Ministry of Agriculture, Water and Land Reform
MCs	-	Mining Claims
MEFT	-	Ministry of Environment, Forestry and Tourism
MHSS	-	Ministry of Health and Social Services
MME	-	Ministry of Mines and Energy
NCCI	-	Namibia Chamber of Commerce and Industries
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 Miner/Small-scale Mining /Small-scale Miners

LIST OF ROADS

B2	-	The route number for the main road starting from Okahandja up to Walvis Bay via the settlement of Wilhelmstal and towns of Karibib, Usakos, Arandis and Swakopmund.
C36	-	The route number for the secondary road that runs from B2 at the settlement of Wilhelmstal and joining C33 just before the town of Omaruru. C36 is a gravel road.
D1941	-	The route number for the district road starting from the C33 (just outside Karibib) to C36 (just north of Wilhelmstal) providing access to several farms in the Karibib district. D1941 is the shortest to the project site from Karibib.

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 ❖ 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 quantitate 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	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	Includes these minerals: **a**lunite, 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 OVERVIEW

1.1 INTRODUCTION

The proponent, Mr Jeano Foelscher, is a small-scale miner (SSM) who is a beneficiary holder of four Mining Claims ('MCs') pegged and registered in his personal name in terms of the Minerals (Prospecting and Mining) Act (MA) which is administered by the Ministry of Mines and Energy (MME). The MCs are pegged on a commercial farm situated in the Karibib-Omaruru-Wilhelmstal triangle in the Erongo Region.

The MCs have these numbers designated to them by MME:

- MC-67922
- MC-67923
- MC-68561
- MC-68562

Semi-precious stones (SPS) is the mineral group registered on the Mining Claim Certificate (MCC). In the Omaruru district where the MCs are pegged, SPS will generally include tourmalines, amethyst, aquamarine, quartz, silver topaz and garnets. Historically, SPS in the aforesaid triangle are found in pegmatite rocks, locally referred to as the Karibib Pegmatite Belt (KPB).

Recently, the proponent has made a discovery of Industrial Mineral Groups (IMG) occurring in KPB with assayed samples yielded the presence of metals such as tin (Sn), tantalite (Ta_2O_6) and lithium (Li) in good grades that warrant further investigations.

Given strong demand for such metals in the wake of decarbonisation initiatives, the proponent would like MME to include IMG on his MCC. This will allow for intense exploration in order to enhance the understanding of the mineralisation of such vital minerals on his four MCs.

1.2 DETAILS OF THE MINING CLAIMS

In **Table 1** below, are the particulars of the four MCs held by the proponent – the designated numbers, date pegged, mineral group permitted and geographical area covered by each mining claim. In terms of section of 28 of MA – a mining claim shall be of rectangular shape with its longest side not exceeding 600 m and the shortest side not exceeding 300 m. The total geographical area of a mining claim must not exceed18 hectares.

It is evident from **Table 1** that the proponent has held all four MCs for many years having first pegged two MCs in October 2007 followed by another two in October 2010.

MC Registered No.	Date MC Pegged	Current MC Status	Coverage (ha)	Current Mineral Group	Proposed Mineral Group
MC-67922	4 Oct 2007	Pending Renewal	15.22	SPS	IMG
MC-67923	4 Oct 2007	Pending Renewal	19.53	SPS	IMG
MC-68561	27 Oct 2010	Pending Renewal	18.51	SPS	IMG
MC-687562	27 Oct 2010	Pending Renewal	17.70	SPS	IMG
Total (ha)			**70.21**		
Exploration Core Drill Hole Footprint (5.70%)			**4**		
Estimated potential mining footprint – 60%			**42**	Exact footprint will be determined after exploration	

1.3 ENVIRONMENTAL CLEARANCE CERTIFICATE

An Environmental Clearance Certificate (ECC - AP10483) allowing mining of SPS on all four MCs was granted to the proponent on 14 September 2022. The validity of the ECC is from the date of issue to 14 September 2025. The ECC is attached in **Fig. 1**.

ECC – AP10483

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 Foelscher
P. O. Box 67, Karibib

TO UNDERTAKE THE FOLLOWING LISTED ACTIVITY

Mining Activities on Mining Claim No. 67922 - 67923 & 68561 - 68562 at Omapyu Süd Farm 77, Omaruru, Erongo Region.

18 OCT 2022

ENVIRONMENTAL COMMISSIONER

Issued on the date: 2022-09-14

Expires on this date: 2025-09-14

(See conditions printed over leaf)

Figure 1: ECC Granted Allowing Mining of SPS from four Mining Claims

1.4 TERMS AND CONDITIONS ATTACHED TO THE MCS

The Mining Commissioner has attached general terms and conditions to the MCs which are repeated here, both for ease of reference and to provide a clear perspective with respect to the amendment sought on ECC – AP10483.

Table 1: Terms and Conditions Attached to the MCs

Terms & Conditions	Applicable Section of the Minerals Act
The Mining Claim Holder shall:	
Enter into a written agreement with the landowner	(Section 52(1)(a)(i)).
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.	Section 52
Not erect or construct any accessory works on a mining claim area without the permission of the Mining Commissioner. Maintain in good condition and repair all accessory works.	Section 31(3)
Carry on mining operations in accordance with good mining practices.	Section 31
Always maintain all mining claim beacons in good condition.	Section28(6) & (7)
Take reasonable steps to warn persons who may from time to time be in the vicinity of any accessory works of any possible hazards.	Section 41(1)(e) to (h)
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.	Section 41(1)(j)
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)
Submit monthly reports to the Mining Commissioner within 15 days after the end of each month, (Section 45(1)(d)).	Section 45(1)(d)
Submit annual reports to the Mining Commissioner within 60 days after 31 December of each year, (Section 45(1)(e)).	Section 45(1)(e)
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.	Section 45
Keep at an address in Namibia a proper record in relation to any prospecting operations for a period of not less than three years.	Section 45(1)ii

1.5 RATIONALE FOR AMENDMENT

The SSM would like IMG added on to his MCC to allow for exploration and mining of such IGM. In terms of section 31 of MA, the holder of a mining claim 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.

1.6 MINING CLAIM TENURE

A mining claim has a tenure of three years from the date that such a mining claim is first registered. Thereafter, a mining claim is renewable every two years for as long as it takes to mine the mineral deposit secured by such particular mining claim. The short tenure (two years) means that the Mining Commissioner can enforce non-compliance of the terms attached to mining claim by declining to renew the mining claim.

1.7 BACKGROUND INFORMATION DOCUMENT (BID)

A background information document (BID) on the project was prepared and submitted to the office of the EC for purposes of project screening. After assessing the BID, a screening notice was issued in which the project was allocated an application number of **APP-002314**. In terms of the screening notice the scope of the EIA has to consist of:

- A scoping report,
- An EMP, and
- Public Consultation Process.

The EIA was then advertised in two local newspapers for two consecutive weeks. EIA posters were also prepared during this phase and posted at the project site. Stakeholders who responded to the EIA were furnished with BIDs and registered for the EIA.

1.8 THE SCOPING PROCESS

The scoping process undertaken for this project has these objectives, to:

- identify the relevant policies and legislation relevant to the proposed activity;
- motivate the need and desirability of the proposed activity;
- identify and confirm the preferred activity and technology alternatives through an impact and risk assessment and ranking process;
- determine the level of assessment to be undertaken, the key issues to be addressed in the assessment, methodology to be applied, expertise required, investigation to be carried out in order to determine the impacts and risks that the activity will impose on the receiving environment, the nature of impacts, significance, consequence, extent, duration and probability of the impacts, and
- identify suitable measures to avoid, manage, or mitigate identified impacts and to determine the extent of residual risks that need to be managed and monitored.

2 PROJECT DESCRIPTION

In this section the project is presented in terms of its location, accessibility, existing workings, accessory works, available resources (water & electricity) and the pilot project. Additionally, an assessment has been made on whether the existing facilities and resources can support the envisaged pilot project.

2.1 PROJECT SITE

The four MCs are pegged on a privately owned commercial farm – Omapyu Süd situated in the magisterial district of Omaruru as more or less depicted in **Figures: 2 & 3**. The nearest town to the project is Omaruru about 40 km away and reached via the gravel road C39 (Fig. 2). Karibib is to the west and about 110 km via Wilhelmstal or 90 km via Omaruru. The nearest railway line is at the settlement of Wilhelmstal about 55 km from the project site (Fig. 2).

Figure 2: Project Location – Nearest Towns and Roads

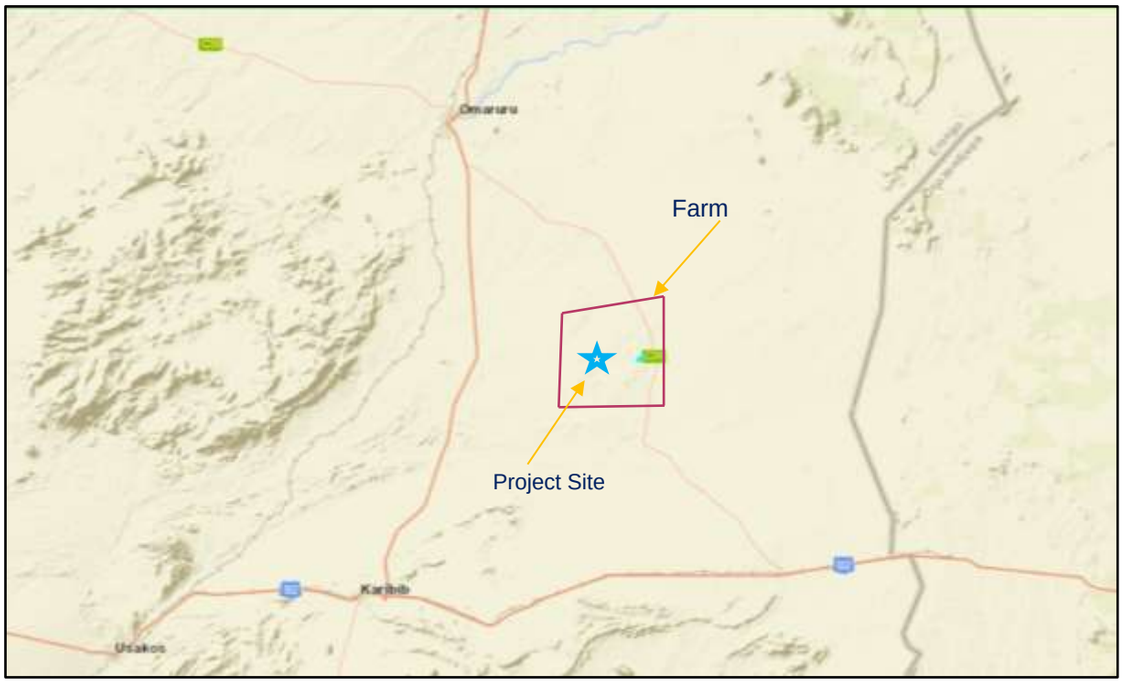

Figure 3: Project Location in Relation to Omaruru, Karibib & Wilhelmstal

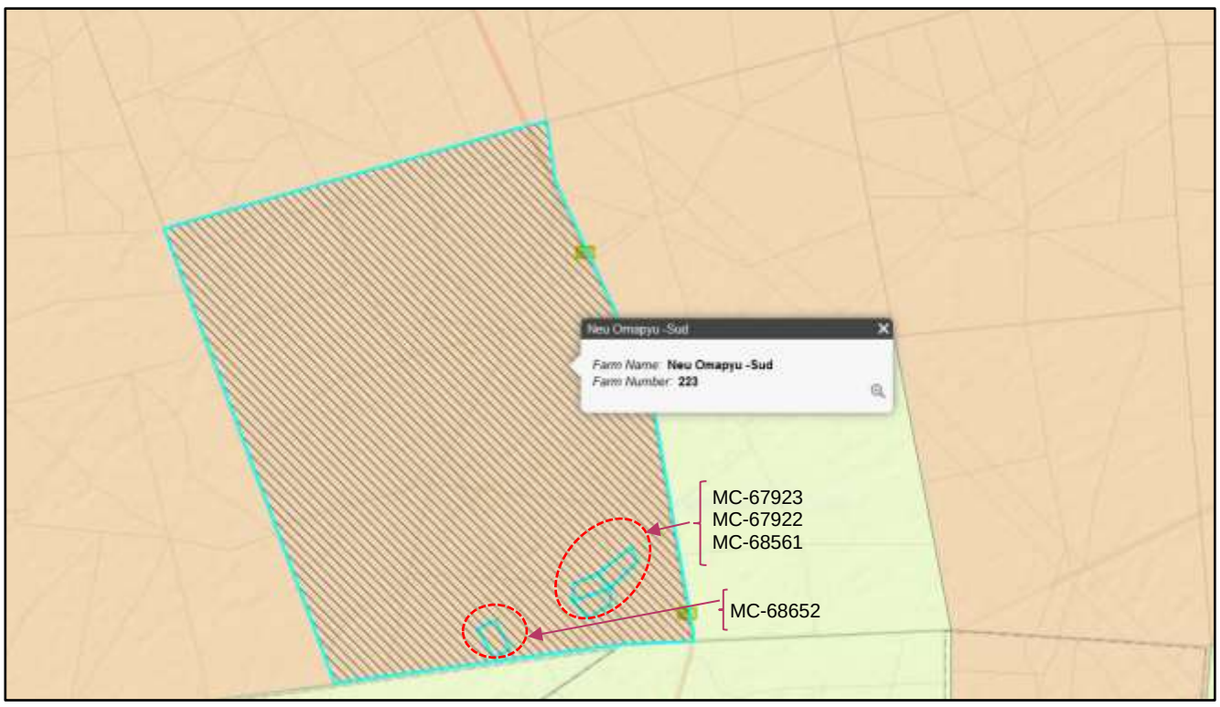

Figure 4: The Location of Four Mining Claims on Farm Omapyu-Sud

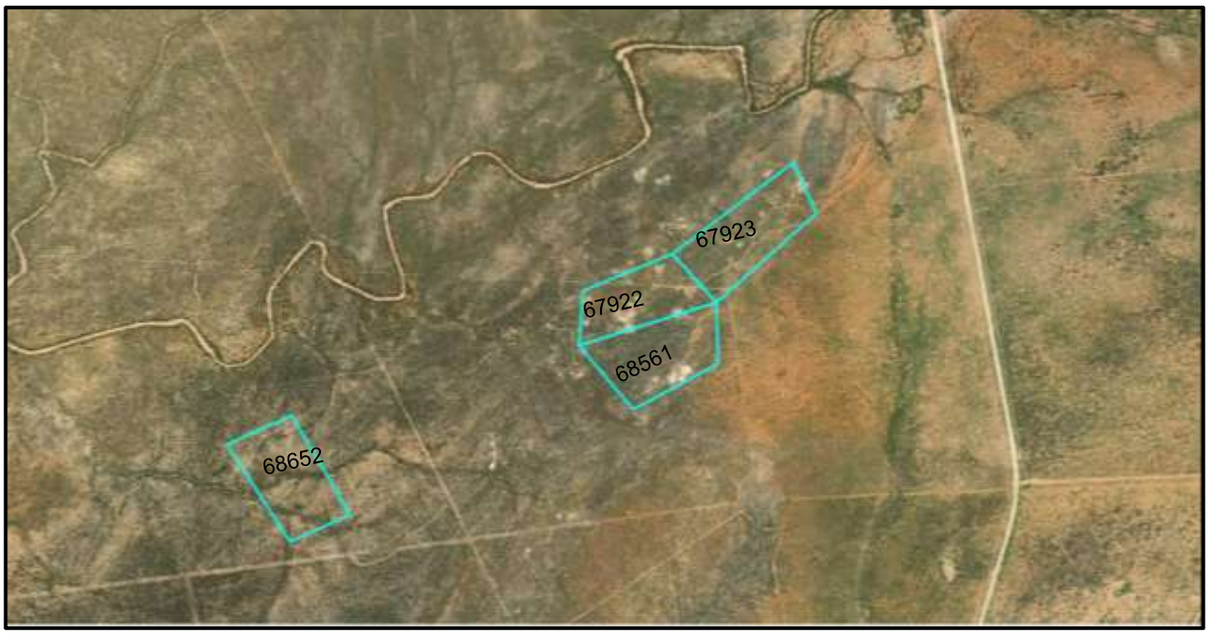

Figure 5: The Position of Four Mining Claims in Relation to Each Other

The four mining claims as depicted in Figures 4 & 5 are to the southeast of the farm. MC-67922, MC-67923 and MC-68561 are pegged in one location and adjacent to each other and can be easily converted into a single mining license, should the proponent so desires. MC-68652 is pegged to the southwest about 5 km away. C39 is about 2 km from the first three mining claims (Fig. 5).

2.2 Existing Services and Infrastructure

2.2.1 Accessibility

Access to the project site is provided by driving on C39 – a good gravel road that links Omaruru to B2 at the settlement of Wilhelmstal. From the farm gate, access to the mining claims is provided by a single farm route (Fig. 6). Within each mining claim, there are several routes leading to working areas. project site is accessed via C36 – the gravel route which links the town of Omaruru to B2 at the settlement of Wilhelmstal. All the four MCs are on the western side of C36 approximately 5 km from the gravel road.

Figure 6: Typical Farm Route

Figure 7: Typical vegetation and access roads on the project

2.2.2 Potable Water

According to the landowner, there are several boreholes sunk on the farm property that are quite deep and yield good quality water. However, the boreholes do not always provide sufficient water for the farming operation, especially during those years of poor rainfall which happens more frequently now. In the event that the proposed exploration leads to the findings of IMG that can be mined commercially, water will have to be sourced from Namwater.

2.2.3 Electricity

A 22 kVA powerline is running through the farm, but the current operations of SSMs do not require the use electricity. In June 2022, a 20 MW solar power plant was commissioned by Nampower about 25 km (Omburu Solar Power Plant) from the project site, which implies that the conditions are quite ideal for solar power generation. In the event of IGM being confirmed through exploration, solar power can be used as alternative energy instead of grid power.

2.2.4 Health Services

The nearest health facility to the project site is Omaruru – about 40 km away.

2.2.5 Existing Workings

According to mining claims database of MME, there are approximately eighteen (18) mining claims pegged on the same farm. Such mining claims have been pegged to mine SPS by several SSMs. The status of the majority of the MCs on the database is either active, pending renewals or indicated as an application only. Generally, mining of SPS is conducted based on the level of the CapEx made and the OpEx at the disposal of the concerned SSM.

Where CapEx and OpEx are constraints, the operation is often rudimentary artisanal, performed by manual labour using basic hand tools (spade, shovel and chisels). Where some CapEx has been invested and OpEx available, the operation is semi-machanised and performed with some machinery and equipment, e.g. a jackhammer powered by an air compressors. The promoter is one SSM who has invested substantial CapEx in his operations.

During the site visit, which was conducted in the company of the farm manager, pegs or beacons marking various mining claims pegged on the farm were observed (Fig. 6 & 7), accessory works (Fig, 8) which included a fenced explosive storage area, stockpiles of screened materials (Fig. 10), unrehabilitated excavations (Fig. 9), deep trenches (Fig. 13), undetonated charged up blasting holes (Fig. 12) which appeared to have been abandoned and a number of deserted shacks (14) dotted all over the farm.

Figure 8: Mining Claim Beacons on the Farm

Figure 9: Accessory Works

Figure 10: Unrehabilitated Excavations

Figure 11: Tailings from Screening Activities

Figure 12: Water Container

Figure 13: Undetonated Blasting Cords

Figure 14: An Abandoned Trench

Figure 15: A deserted shack

2.3 THE EXPLORATION

The proposed exploration is intended to identify and to define IMG mineralisation that can be mined economically with a specific focus on 'lithium metal'. There is strong demand for lithium in the world market driven by the production of lithium batteries to power electrical vehicle and other products vital for decarbonisation initiative.

2.3.1 MACHINERY & EQUIPMENT FOR THE PILOT PROJECT

A list of earthmoving machinery, plants and equipment presented to Ekwao Consulting by the promoter is presented in **Table 2**, below:

Table 2: List of Machines & Plant

Activity	Machine/Plant Type	Capacity/Sizes	Units
Drilling	Diamond Core Drill Rig	Drill borehole of 75 mm Ø	1
Ripping & dozing	Bulldozer	20 ton	1
Loading & rock handling	Excavator	30 ton	1
Crushing & screening	Mobile Crush-Screening Plants	150 tph of plant head feed	1
Hauling of Rock around MCs	Articulated Dump Trucks (ADTs)	30 ton payloads	2
Loading of rock materials	Frontend Loaders	Various sizes	1
Road maintenance	Grader	30 ton	1
Water supply	Water bowser	10 000 liters	1

2.3.2 LITHIUM – WHAT IS IT?

Lithium is a chemical element with (i.e. an alkali metal) with the symbol of Li and an atomic number three in the periodic table of elements. It is the lightest metal, the least dense and can float on water. Due to its reactivity, Li does not occur in elemental form in nature. In the latter part of the 20th century, Li has become an important ingredient in the manufacturing in Li-ion batteries that are used in gadgets such as smartphones, laptops, cameras, iPods, computers etc. With the impetus to decarbonize the world with a strong focus on the manufacturing of electric vehicles, there is growing demand for lithium which is projected to grow even stronger going into the future.

There are many known minerals that contain Li, but there are only a few of such minerals that can be considered as economic sources of Li. **Table 3,** below describes the most common Li-bearing minerals found in economic deposits (*source: GGS 2016*). Hardness given in Mohs scale. Density in kg/m^3). Importance as economic source for lithium is also specified. ally less than ten

Table 3: Lithium-bearing minerals found in economic deposits

Mineral	Formula	Li-content (Li wt. %)	Description	Economic Importance
Spodumene	$LiAlSi_2O_6$	3.70%	Most abundant Li-bearing mineral found in economic deposits	High
Lepidolite	$K_2(Li,Al)_{5-6}(Si_{6-7}Al_{2-1}O_{20})(OH,F)_4$	1.39% – 3.60%	Uncommon form of mica that is found in pegmatites. Hardness of 2.5 -3 and density 2.8 to 3. Colourless, grey, yellow or white vitreous	Low
Petalite	$LiAlSi_4O_{10}$	1.60% – 2.27%	Monoclinic with two cleavage directions. It often occurs in pegmatites and can alter to spodumene. Hardness of 6 and density of 2.4. Colourless, grey, white, vitreous to pearly	Low
Eucryptite	$AlAlSiO_4$	2.10% – 5.53%	Formerly an important source of Li worked in Zimbabwe, but deposits are rare. Hardness of 6.5 and density 2.6. Brown, Colourless or white, vitreous.	Not current used
Amblygonite	$LiAl(PO_4)(F,OH)$	3.40% - 4.70%	It was also mined for Li in Zimbabwe. Deposits are uncommon. Hardness of 5.5 to 6 and density 3. White, yellow or grey, vitreous to pearly	Not currently used

Hectorite	$Na_{0.3}(Mg, Li)_3Si_4O_{10}(OH)_2$	0.54%	Trioctahedral smectite clay mineral formed from alteration of volcaniclastic rocks by hydrothermal activity and hot-spring waters. Hardness 1-2 and density 2 to 3. Opaque white	Possible future source
Jadarite	$LiNaSiB_3O_7(OH)$	7.30%	Monoclinic borosilicate mineral discovered in Serbia in 2007. Hardness 4-5 and density 2.45. White, porcellaneous.	Possible future source

Between 1939 and 1998, spodumene, lepidolite, petalite and amblygonite minerals in **Table 3**, have been mined in Namibia but in relatively small quantities. The Rubicon mine south of Karibib has the longest history of lepidolite production.

2.3.3 Lithium Trades

Lithium mined from pegmatite rock is primarily sold as concentrates of either spodumene, petalite or lepidolite with minor quantities of amblygonite (*M Schmidt, 2020, Lithium Potential in Namibia*). Concentrates are usually graded and priced according to their Li_2O content and impurity levels. Each industry has its unique set of requirements with respect to desired chemical composition, particle size and tolerable values of impurities.

Concentrates for the battery industry are rated 'chemical grade' while concentrates destined for the glass industry are rated, 'technical grade'. In general, the glass industry has tighter limits on certain impurities as the battery industry due to the direct usage of the concentrates in the respective flow sheets.

The current industry standard for Li concentrates in the battery industry is called SC-6, a chemical grade spodumene-concentrate that contains approximate 6% Li_2O. High values of Li are uncommon as concentrating them beyond 6% Li_2O increases the cost of production exponentially.

Spodumene-concentrates with lower Li_2O contents (2.2% -5%) were sold at lower prices per ton and shipped as so-called DSO ('direct shipping ore'). Such shipments of DSO's out of Australia has significantly decreased because the monetary values from DSOs was quite low while concentrates with higher values were available elsewhere.

2.3.4 Lithium Mining in Namibia

Lithium has been mined in Namibia between 1939 and 1998, with lepidolite and petalite as the main source minerals. Production varied on a year-to-year basis and fluctuated between 1 000 and 10 000 tons until 1980. Production from the mineral, amblygonite has always been small, and never exceeded 1 000 tons per year, when compared to lepidolite and petalite. From 1980, production was mostly from petalite. (*Lithium Potential in Namibia, 2020*). Mining of lithium ceased altogether in 1998.

There is renewed interest for lithium exploration in Namibia with several role players having snatched up known lithium mineral assets in several parts of the country. Some of the projects at different levels of exploration, feasibility phases or construction (development) are:

Table 4: Lithium Projects underway in Namibia

Promoter	Brief Description	Status
The Soris Project (De Rust pegmatite)	Mining for tin and tantalite has been conducted at the De Rust pegmatite swam for a number of years in the past. The project is exploring for lithium resources on its EPL which covers the De Rust pegmatite.	Feasibility stage
Lithium Africa 1 (Uis)	The promoter is evaluating the former Iscor tailing dumps for re-processing in order to recover lithium which was never recovered by Iscor when it operated the mine in the seventies. Considering that there is no mining involved, lithium contents shown are encouraging.	Feasibility stage
AfriTin Mining (recently changed its name to **Andarada Mining**) (Uis)	The company revived tin mining at the old Iscor Tin mine at Uis in the last quarter of 2019. Tantalite also recovered. Started exploring for lithium within its EPLs	Tin and tantalite are being mined. Lithium exploration is ongoing.

Karibib Lepidolite Project (Karibib)	The promoter resumed lithium exploration at an old property where lithium was mined over 30 years ago – the Rubikon mineral asset. A lithium concentrate will be produced for export.	Development phase
Xinfeng Investments (Omaruru)	The proponent was granted a Mining Licence in September 2022 and started mining immediately while continuing to explore targeted spots within the EPL. It is reported that the first consignment of 120 000 tons of DSO was exported from Walvis Bay during the firt quarter 2023. The promoter is exporting Lithium Ore which trucks to Walvis Bay.	Production phase
Omaruru Lithium Project (Omaruru)	The promoter (Prospectus Resources Ltd) is conducting lithium exploration within an EPL owned by Osino Resources located in the Karibib-Omaruru-districts. Good grades of lithium confirmed.	Exploration phase
Tantalite Valley (Warmbad)	Located near Warmbad in the Karas Region, this is the only lithium mineral prospect that lies outside the Erongo Region. Tantalite has been mined in the past from the resource.	Tantalite is being mined while exploration for lithium has been initiated.

In **Table 16**, are lithium production statistics between 1939 and 1998, (source: Lithium Potential in Namibia, 2020). The same source stated that about 500 tons of lithium was mined in Namibia in 2018. It is uncertain where the materials were mined from. Expectations are that Namibia will become a significant lithium producer role player The above projects are likely

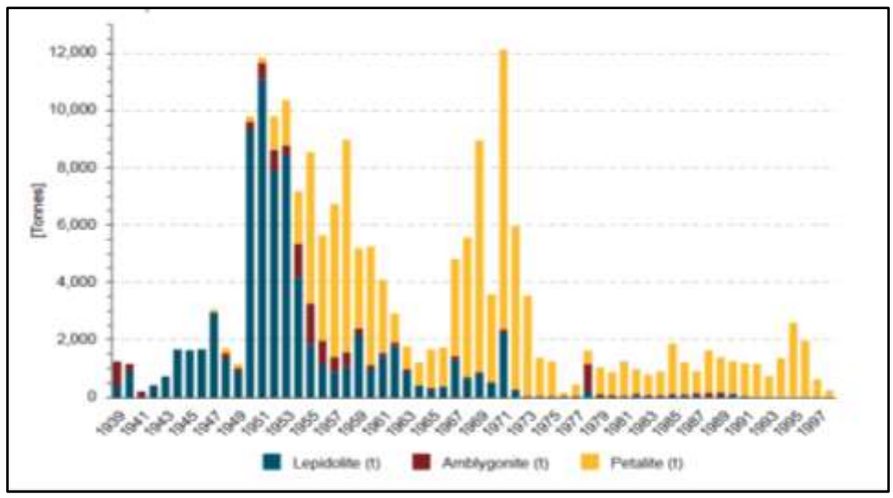

Figure 16: Lithium Production Namibia between 1939 to 1997 (After Scheinder, BGR, 2020)

2.4 PROJECT TRIGGERED IMPACTS

Traditionally, mining of SPS is often conducted by manual labour or with simple basic equipment – a jackhammer powered by an air compressor. The impacts associated with such an operation are therefore adequately addressed via an environmental pro-forma contract in which the SSM undertakes to rehabilitate and restore the site on completion of mining activities.

The proposed exploration operation carried out in tandem with mining will trigger impacts, both negative and positive far beyond the scope provided for by a pro-forma environmental contract. It is for this reason that a scoping assessment has been carried out and an EMP formulated to mitigate the environmental impacts associated with the operation. Potential impacts associated with exploration and mining activities on the four mining claims are listed in **Table** 5, below:

Table 5: Project Activities & Potential Impacts

Environmental Management Plans

EMP for the Planning and Mobilisation
- Compliance Issues
- Communication with Stakeholders & IAPs
- Embracing green technology/decarbornisation
EMP for Establishment of Support Infrastructure
- Maintenance Yard/Workshop
- Site Office
- Areas for Meal Preparation and Eating
- Ablution Facilities
- On site Accommodation
- Access Routes to Exploration Sites
- Environmental Awareness
EMP for Exploration Induced Impacts
- The Ecosystem
- Surface Water
- Groundwater
- Topsoil Protection and Soil Erosion
- Land Use
- Structural Damage to Farm Infrastructure
- Landowner Security
EMP for Generic Environmental Impacts
- Noise Pollution
- Air Quality (Dust impacts)
- Waste Handling
- Emergency Preparedness Plan
  - Fire Risk Plan
  - Spill Management Plan
- Heritage & Cultural Resources
- Visual Intrusion
EMP on Socio-economic Environment
- Employment
- Support to the Local Economy
- Transfer of Skills and Technology
EMP on Rehabilitation and Decommissioning
- Planning
- Rehabilitation of Exploration Sites
- Rehabilitation of Campsite, Access Routes, Fencing & Gates
- Inert Waste
- Hazardous Waste

3 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 requirements of a proposed activity, which may include alternatives to the:

- type of the activity to be undertaken;
- design or layout of the activity;
- technology used in carrying out the activity;
- property on which 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:

- the 'no-go action' alternative;
- location of the project;
- mobile plants vs fixed plants;
- exploration/mining techniques and methods; and
- working hours.

3.1 THE NO-GO ACTION ALTERNATIVE

This alternative implies that the status quo remains, and nothing happens, i.e. the proponent continues to mine SPS without conducting exploration in order to define IMG resources on the mining claims as provided for in MA. From an environmental perspective, this option is perhaps the preferred one, because the negative impacts associated with exploration and mining of IMG will not occur. However, the exploration will not be conducted on virgin land but on the same mining claims on which SPS mining has been conducted since 2007. The 'no-go' option will therefore be undesirable from this aspect alone.

3.2 LOCATION OF THE PROJECT

The location of the project site is, in principle determined by the mineralisation of SPS in pegmatite rocks that are formed as a result of geological processes. The pegmatite outcrops in a geographical area over which the proponent has secured mining rights by pegging and registering MCs over that land. The proponent is restricted to only mine the mineral resource within the confines of its MCs. The location of the project site is therefore static and cannot be altered or changed to another site.

The only flexibility available with respect to the project location is to choose the specific site within each of the four MCs where to erect project supporting infrastructure, e.g. campsite, workshop, ablution facilities, etc.

3.3 MOBILE PLANTS VS FIXED PLANT

The use of mobile plants as opposed to fixed plants is considered more suitable for the envisaged activity. Mobile plants do not require construction of foundation for installation hence minimal environmental impacts. In the absence of a defined mineral resource combined with no knowledge of its characteristics, the use of mobile plants as opposed to erecting permanent plants/structures is considered as the best alternative from the environmental perspective.

3.4 EXPLORATION/MINING TECHNIQUES AND METHODS

The proponent did not provide any exploration-mining techniques which he intends to use. Considering that a typical mining claim has a rectangular shape with the dimensions of 600 m long by 300 m wide, the exploration techniques which can be used are:

3.4.1 GEOLOGICAL MAPPING

Geological mapping is a crucial aspect of mineral exploration as it involves the basic process of recording geological information starting with rocks that outcrop to the surface. Primary lithology and morphology of rock bodies as well as age relationships between rock units are provided on a geological map. Ideally, geological mapping should be conducted concurrently with the geochemical sampling.

3.4.2 GEOCHEMICAL SAMPLING

This is a non-invasive technique to determine the existence and extent of mineralization hence a potential resource. Geochemical data are used to focus on areas of higher mineral potential as the exploration progresses and help to define potential drill targets. They assist the exploration crew to drill more selectively and thereby increase the chances of intersecting zones of mineralisation hence reducing the overall footprint of exploration and associated environmental impact in the target area.

3.4.3 GROUND GEOPHYSICAL SURVEYS

This exploration technique includes the use of magnetic induced polarisation (IP) and electromagnetic (EM) to collect data that give an indication of essential rock properties, particularly at depths. The technique can be used map the geological structures. Essentially, the technique includes sending electrical currents into the ground measured via electrodes along a linear cut-lines up to several meters long providing access to electrical cables. Small holes in the ground are required for IP electrodes every 25 or 50 m along a survey line. The majority of EM techniques are completely non-invasive and operate by sending electromagnetically induced currents into the ground.

3.4.4 DIAMOND DRILLING

This exploration technique entails the use of a diamond drill in order to obtain core samples of 2 cm or more in diameter. Bio-degradable drill additives will be used during diamond core drilling. Soil, rock and drill core samples are sorted at the exploration site office. Exploration activities are usually undertaken in phases with periods of no field activities between them, whilst awaiting analytical results from laboratories, and the integration and interpretation of data to decide the next course of exploration stage.

3.5 MINING OPERATION

The parameters for the mining operation of any IGM that may be defined will only become known after the exploration activity in a particular mining claim has been successful completed. Such parameters will include these aspects:

- amount of overburden (waste) to be stripped,
- drilling and blasting requirements,
- type of explosives to be used,
- grades of run-of-mine,
- volume of ore to be mined per day/month/year, etc,
- crushing and milling requirements
- amount of consumable (water, fuel electricity, etc.) required for the operation
- personnel requirements and level of skills and experience, etc.
- Capex and OpEx requirements, etc.

3.6 WORKING HOURS

The location of the project site is on a commercial game farm where a lodge is being operated including trophy hunting during the hunting season. In fact, two neighbouring farms Otjimbojo to the SW and Omapyu Sud to NW, are game farms with lodging facilities. Whilst the lodges are far away and out of sight of the mining area, to run the operation on a 24-hours basis is not considered a workable alternative.

Confining the exploration /mining operation to day-light hours of 06h00 to 18h00 which gives 10 hours of effective hours should be a feasible alternative from an environmental perspective.

4 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

4.1 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
- 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.

4.2 OTHER APPLICABLE LEGAL INSTRUMENTS

Listed in **Table 6** below are other laws and regulations which have a bearing to the subject project.

Table 6: Applicable Policies and Regulations and Policies

Legislation	Main Aspects
Constitution of the Republic of Namibia	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). CHAPTER 3 – Fundamental human rights and freedoms. CHAPTER 11 – Promotion of the welfare of the people ARTICLE 95 (I) 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. ARTICLE 95(J) 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.
Minerals (Prospecting & Mining) Act, Act No. 33 of 1992	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: 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 PART 12 : Provisions relating to Mining License

Legislation	Main Aspects
Environmental Management Act (Act. No. 7 of 2007)	a) 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. b) 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)	a) Heralded the implementation of the Environmental Management Act almost five years after the Act was approved by the legislature. b) Presents a list of activities that require an ECC prior to commencement. c) Regulates and provides guidelines on how EIAs must be conducted.
Local Authority Act (Act No. 23 of 1992)	a) The Act defines the powers, duties and functions as well as terms of office of local authority councils. b) Provides services such as water, electricity, sewage, waste removal, etc. to residents within a local area. c) Regulates effluent discharge into the sewer system. d) 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)	a) The Act makes provision for the procurement, handling, storage and distribution of petroleum products. b) Empowers the line Minister to increase/decrease pump fuel prices in the country as well as for the imposition of levies on energy sources. c) Also provides for the issuing of various permits including Consumer Installation Certificate
Road Fund Administration Act	a) Regulates traffic and use of public roads including aspects related to road safety, vehicle licensing, roadworthiness, Mass Distance Charges, abnormal loads. b) 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)	a) The Act provides for a legal framework for a structured more uniform public and environmental health system and for matters incidental thereto. b) It deals and provides guidelines on noise generation and control thereof within an urban environment. c) Also deals with waste management, handling or collection, waste disposal, waste recycling, sanitation, etc.
Hazardous Substances Ordinance (No. 14 of 1974)	a) Provides for the control of hazardous substances with potential to cause harm, injuries and even death. b) Also provides for the manufacture, handling, storage, sale, use, disposal, etc. of hazardous substances.
Atmospheric Pollution Prevention Ordinance (No. 11 of 1976)	a) Provides control of noxious or offensive gases and matters incidental thereto. b) 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)	The following permits are required in terms of the Water Act: a) water abstraction permits; b) domestic effluent discharge permits (site offices, construction camp); industrial effluent discharge permits; c) water use for dust suppression; and water reticulation permits (pipelines). Will be superseded by Water Resources Management Act 2013 once the regulations are implemented in the future.
The Soil Conservation Act No. 76 of 1969	a) The act makes provision for combating and prevention of soil erosion and promotes the conservation, protection and movement of soil, vegetation, sources and resources. b) Fuel storage and handling is more often associated with spillages which could end up contaminating the soil.
National Heritage Act No. 27 of 2004	a) No archaeological/heritage site or cultural remains may be removed, damaged, altered or excavated. b) 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. c) 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)	a) The Hazardous Substance Ordinance No. 14 of 1974 was repealed and amended by the Atomic Energy and Radiation Protection Act.

Legislation	Main Aspects
	b) 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. c) Whilst the environmental aspects are not really explicitly stated, the Act provides guidelines with respect to importing, handling and storage, etc. of hazardous substances.

4.3 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 7**, below.

Table 7: 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 Conversion 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 Conversion on Climatic Change	ESTABLISHED 1992: – 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.

5 THE 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;
- Digital Atlas of Namibia which was itself compiled by the University of Cologne based on the data sourced from the Directorate of Environmental Affairs of MEFT;
- Groundwater in Namibia, an exploration to the Hydrogeological Map;
- Namibia Weather Services website (www.namibiaweather.info)
- 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.

5.1 THE PHYSICAL ENVIRONMENT

With respect to the physical environment, the settlement of Wilhelmstal has been taken as a reference point. From Wilhelmstal, the road distance to the project site is 35 km and situated on the west of C36.

5.2 CLIMATE CONDITIONS

There is no weather station on the farm and the information presented on climatic conditions is derived from the nearest weather stations, being Karibib which is about 30 km as the craw flies.

5.2.1 TEMPERATURE

The temperatures are represented in Figure 17 below. High temperatures are recorded during the months of September through to February with the average of about 32 ^{0}C. May through to August are the coldest months when day temperatures average about 10 ^{0}C. Occasionally, temperature have dropped below zero during June. temperatures within the study area are recorded during the months of June through to August.

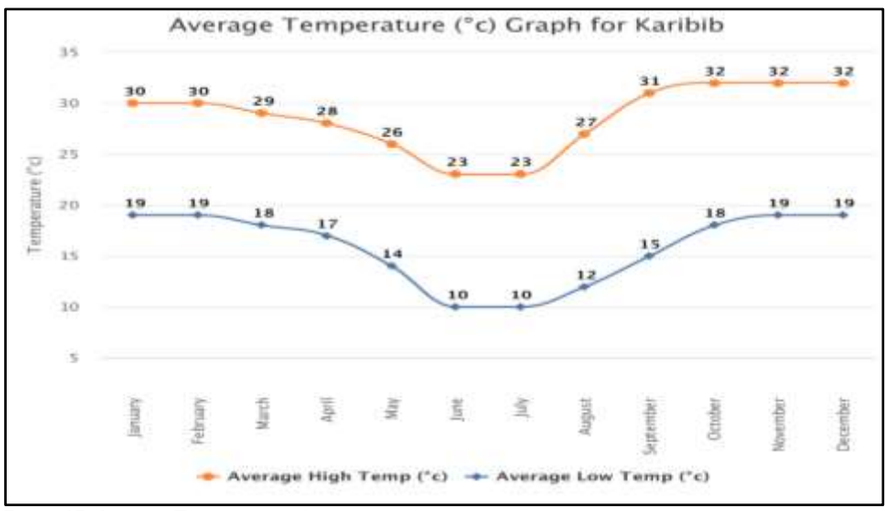

Figure 17: Average Temperatures (source: worldweather online)

5.2.2 RAINFALL

The annual rainfall around the study area is highly variable and unreliable as depicted in **Table 18** below. Over the last ten rainfall seasons, the average annual rainfall over the project site has been 240 mm, with most precipitation occurring between November through to April. Most precipitation is received in February.

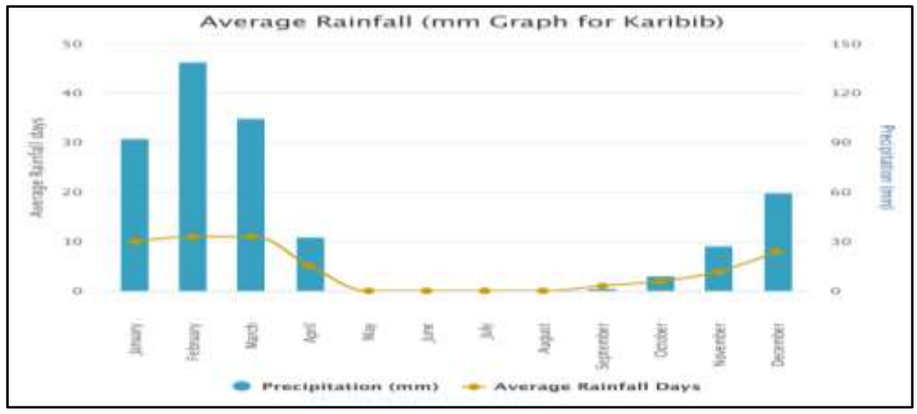

Figure 18: Average Rainfall (source worldweatheronline)

5.2.3 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.

5.2.4 Sunshine Hours

It is evident from Fig. 11, 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/m^2 – ideal conditions to generate electricity using PV.

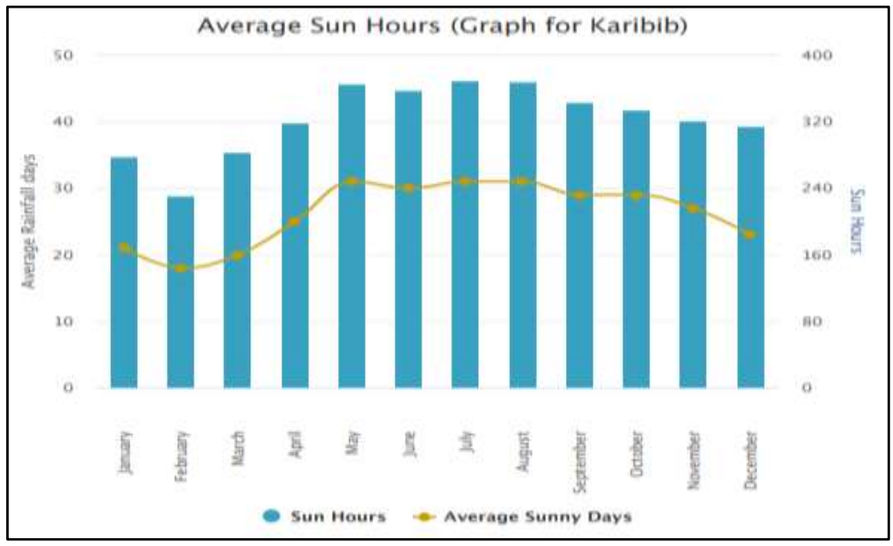

Figure 19: Sun Hours around the project site (source worldweatheronline.com)

5.3 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 C36 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 Otjisemba settlement, northwest of Okahandja is the main feature crossing the farm to the south. 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.

Figure 20: The Khan River south of the Project Site

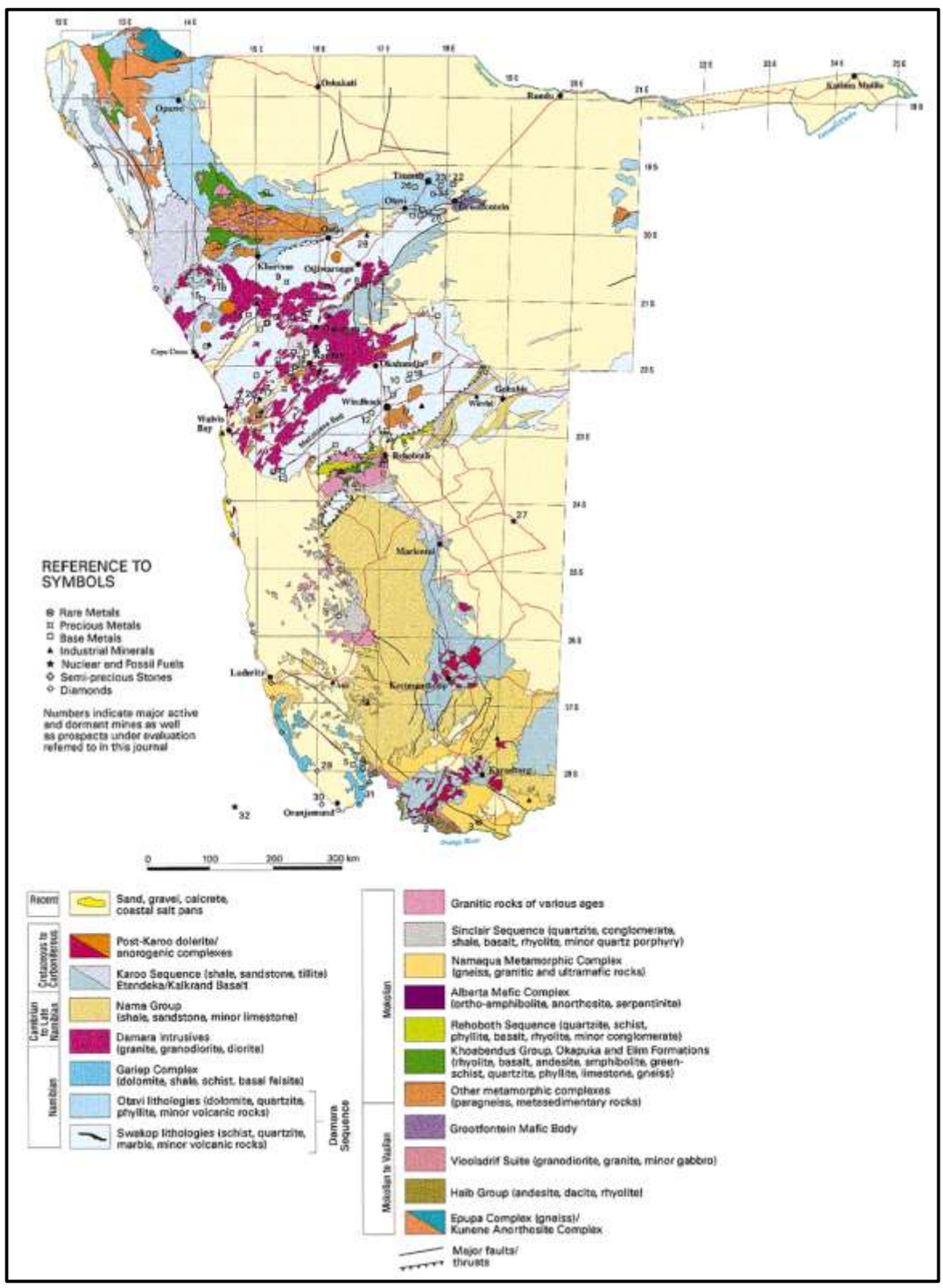

Figure 21: The Geological Formation of Namibia

5.4 GEOLOGICAL ASPECTS AND HYDROLOGY

A geological formation map of Namibia is presented in Figure 21**.** 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 from1958 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 m^3 to 2 m^3 per hour.

5.5 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.

Within the study area, semi-precious stones mined by SSMs are found in at least two soil types or geological formations. 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.

5.6 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 km^2 - of freehold land used for wildlife farming in the country. Of these land, about 34 000 km^2 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.

5.7 THE BIOLOGICAL ENVIRONMENT

5.7.1 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 Fig 6 above. 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.

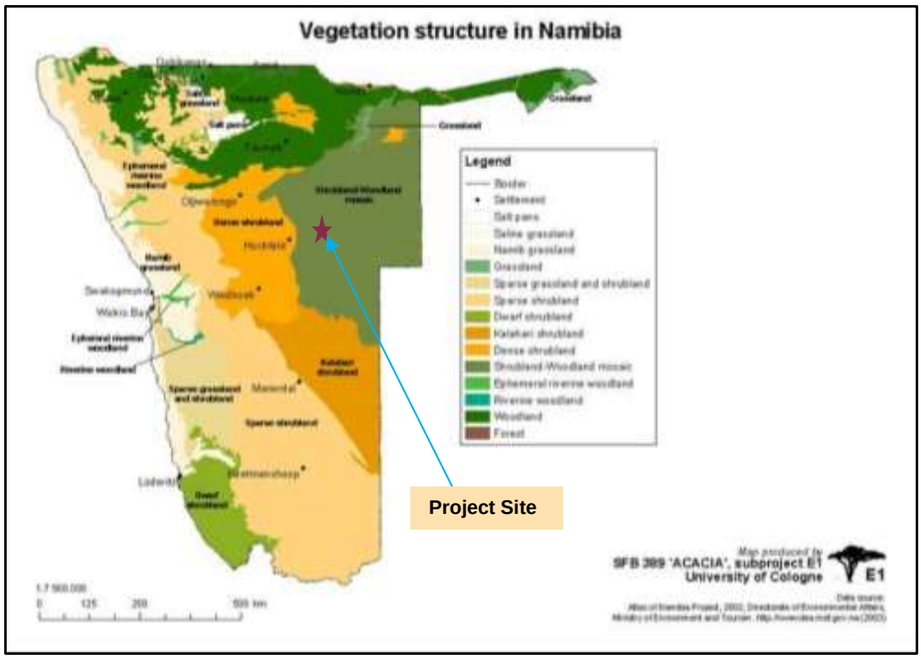

Figure 22: Vegetation Structure in Namibia

5.7.2 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.

5.7.3 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 8: List of Mammals

Oryx Greater Kudu Springbok Common Eland Hartebeest Zebra Hartmann's Common Warthog Wildebeest, Blue Giraffe Zebra Plains	Impala, Common Waterbuck Sable Antelope Impala, Black faced African Ground Squirrel Bat-eared Fox Jackal, Black-backed Wildebeest, Black	• Bat-eared Fox • Chacma Baboon • Dassie • Cheetah • Ostrich, Common • Damara Dik-Dik • Honey badger • Leopard • Steenbok	• ***Blue Wildebeest*** • ***Damara Dik-Dik*** • ***Duiker*** • ***Hedgehog*** • ***Pangolin*** • ***Cheetah*** • ***Leopard*** • ***Honey Badger*** • ***Red Hartebeest*** • ***Steenbok, and*** • ***Common Eland***

In **Table 8**, 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.

5.7.4 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.

5.7.5 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.

5.8 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.

5.8.1 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.

5.8.2 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.

6 DESCRIPTION OF PROJECT IMPACTS

Potential impacts that are likely to arise from the project implementation – exploration activities to define IMG on the four mining claims (MCs) are presented here. It is understood that the two operations will be performed in sequence as follows:

- First, exploration is conducted on one mining claim (typical size of a mining claim is 18 ha or 18 000 m^2) or on a section of the mining claim with the objective to define a mineral resource (industrial mineral). Where the results from exploration yields no mineral resource that can be economically mined, the site is rehabilitated and no mining of IMG takes place on that specific mining claim.

- Second, where exploration work defines a mineral resource that can be mined economically, extraction or mining of the resource is carried out, followed by further onsite processing, i.e. crushing and screening.

- There is no provision made for milling activities, i.e. post primary and secondary crushing of run-of-mine.

6.1 ESTABLISHMENT OF EXPLORATION SUPPORT INFRASTRUCTURE

6.1.1 THE MAINTENANCE YARD

A maintenance yard has to be established where to keep machinery, equipment and vehicles needed for exploration activities. The yard is also where servicing and maintenance of such equipment is performed. The maintenance yard has to be located on one of the four mining claims. When planning and designing the maintenance yard, the following guiding principles should apply:

- locate the maintenance yard at a strategically efficient location within the mining claim away from any sensitive areas;
- locate and operate storage sites to minimise impacts to the natural environment and to control nuisance effects such as noise, dust, litter and visual intrusion;
- use low permeable surfaces to minimise infiltration, and
- provide suitable sanitation facilities and keep the campsite neat and tidy at all times.

6.1.2 ACCESS ROUTES TO EXPLORATION SITES

All planned exploration activities will take place within the confines of the four mining claims held by the promoter on which mining activities for SPS has been undertaken since 2007. Existing routes that are used for SPS mining must be used for all exploration work and no new routes should be constructed.

In the event that a new access route to an exploration site has to be constructed, consent of the landowner should be obtained where such access route is outside the mining claims.

Amongst the management measures recommended in the EMP are:

- avoid sensitive areas when constructing access roads to new exploration and mining sites within each mining claim;
- where an access route has to be constructed out the mining claim, written consent should be obtained from the landowner;
- select the route which allows the least removal of bushes and trees.
- where possible existing routes along fence lines should be used as far as far possible;
- no more than two roads should be constructed to access an exploration site;
- vehicles should be operated on this road only and no off-road driving is allowed;
- limit speed to a maximum of 30 km/hr on access roads, and
- maintain access routes regularly.

Note:
In terms of the Minerals Act – a maintenance yard is regarded as accessory work and, prior to establishing, written permission must be obtained from the Mining Commissioner and the landowner.

6.2 ON THE ECOSYSTEM

Potential impacts from exploration activities on the ecosystem could include the following:

- loss of or disturbance to vegetation, including species of conservation concern, from vehicles traversing areas or on-site activities;
- disturbances to fauna, particularly species of conservation concern, as a result of on-site activities; and
- enabling the establishment of alien and invasive species in disturbed areas.

6.2.1 POTENTIAL LOSS OF OR DISTURBANCE TO VEGETATION AND FAUNAL HABITATS

Vegetation would be cleared and/or disturbed as a result of the proposed exploration activities, including the establishment of work platforms, possible creation of new access tracks, etc. The clearing of vegetation and exploration activities may also result in the loss or disturbance to habitats of faunal significance.

Remarks: Based on industry standards, an area of about 1 000 m^2 is required for a typical diamond core drill rig and associated equipment. It is understood that a total of ten (10) boreholes will be drilled per mining claim. The cumulative exploration footprint will amount to 1 ha or 10 000 m^2 per mining claim or 4 ha for all four mining claim. Thus, the extent of vegetation exposed to these risks is very limited. The potential impact on the vegetation and faunal habitats will be minimised because each exploration site will carefully selected. All exploration activities will be confined on disturbed sites within each mining claim. Any sensitive natural vegetation or habitats, watercourses and steep slopes has to be avoided.

Other possible mitigation measures that will be considered are provided in the EMP.

6.2.2 POTENTIAL DISTURBANCE TO AND MORTALITY OF FAUNA

In addition to the indirect impact on fauna as a result of loss or damage to natural vegetation (faunal habitat), animals in the vicinity of the exploration sites may be affected by increased human presence / activity, and increased noise and vibration generated by exploration machinery, equipment and vehicles.

Remarks: A number of studies have indicated that that noise and vibration can have a negative impact on wildlife, mostly observed as behavioural changes including startle and alarm response, with animals moving away from a source of noise and activity (particularly mobile species such birds, large snakes and medium-sized mammals). However, many reptiles and small mammals (rodents and insectivores) may hide underground and may be directly impacted by site clearing. Others may not be able to move out due to a lack of alternate habitat.

Drilling noise could affect sensitive species, forcing individuals to move away from the source. Some may abandon their shelters. However, most animals would return to the area after the noise or disturbance has ceased, which would be within a few weeks after the activity had ceased. Drilling noise and other disturbances would be unlikely to alter feeding and breeding behaviour or displacement of animals from their preferred habitats, as it would not be of sufficient duration to cause species not to return in the short-term.

In addition to disturbance of faunal movement, direct mortality could result from the proposed onsite activities. Although exploration activities may lead to direct mortality of individuals that cannot safely flee the site, it is not expected that any species of conservation concern would be encountered in large numbers, and there would thus not be a permanent impact on any population/species as a whole.

Important Aspect:

The exploration activities will be conducted on mining claims which are brownfield sites – the significance of this impact would, to a large extent, be minimised by ensuring that exploration sites are preceded by careful planning including the placement of drill sites within previously disturbed areas. Other possible mitigation measures that will be considered for inclusion in the EMP include:

- Restricting vehicles to existing roads and tracks, as far as possible;
- Imposing and enforcing speed limits;
- Implement buffer zones, and
- Where possible, exploration operations should be scheduled to take place during least sensitive periods, avoiding migration and nesting and or mating season.

6.2.3 ENABLING THE ESTABLISHMENT OF ALIEN AND INVASIVE SPECIES IN DISTURBED AREAS

The establishment of alien and invasive plant species may be enabled by disturbances to the natural vegetation. Thus vegetation clearance and soil excavations during exploration could be the catalyst that enables alien and invasive plant species to colonise in new areas. The introduction of alien invasive vegetation could occur as a result of vehicular traffic and the import of materials.

Remarks: Alien and invasive plant species are quite common in the region and are known to have impacts on natural vegetation, water resources and fauna. It is estimated that only approximately 1 ha per mining claim would be subject to actual disturbance from exploration activities, the extent of disturbed areas vulnerable to colonisation by alien and invasive plants is very limited.

Indirect impacts on natural vegetation from the inadvertent introduction of alien vegetation (through imported material /seeds or vehicles brought in from other areas) can be adequately managed through implementation of an alien eradication / monitoring programme. The specific requirements for an alien eradication / monitoring programme are provided in the EMP section.

Potential Impacts

All exploration work will be restricted to existing mining claims (brownfield sites) on which SPS has been mined since 2007. Access to exploration sites is provided by the existing farm routes and or internal mining claim routes, and therefore no vegetation clearance is required hence minimal ecological impact.

Movements of machinery and vehicles will be limited between the exploration campsite and exploration sites with no movements outside the confines of a mining claim.

6.3 IMPACT TO SURFACE WATER

There are no significant sources of permanent surface water such as springs, pans, wetlands and or watercourses in the project area. During the rainy season surface water is found in several river streams the majority of which discharge their flow into the Khan River to the southeast of the project site. (Fig. 20). The farms in the area are dependent on water supplied from boreholes. Baseline water quality in the area is generally good. Any changes to the quality or quantity of water in surface resources may affect adjacent users who rely on water for domestic, agricultural and industrial use.

6.3.1 ALTERED SURFACE WATER HYDROLOGICAL PATTERN

Potential changes to the surface water hydrological regime (surface flow, drainage patterns, sediment load and availability) could have secondary impacts on water users and terrestrial and aquatic environment.

The proposed exploration activities are unlikely to have any real effect on the overall hydrological regime in the area because the small footprint of proposed activities would not alter natural surface drainage patterns. The project activities would, for the most part take place within the confines of the mining claims which have been previously disturbed.

No activities are proposed that would impede or divert the flow of water in, or alter the bed, banks, course or characteristics of a watercourse.

Disturbed areas would be rehabilitated to re-establish the pre-exploration land use (in consultation with landowners).

Key Aspects

Water required for the exploration activities can be accurately estimated. Exploration water can be trucked from either Omaruru or Karibib. Drilling an own borehole drilled on the farm with the permission of the Farm Manager and MAWLR will also be a feasible option.

At this stage the amount of water that may be required for any mining operation on the mining claims cannot be determined because the orebody to be mined is unknown – it has not been definite yet. Once an orebody has been defined, a separate scoping assessment will have to be carried out to assess the impacts which mining activities will have on the receiving environment.

6.3.2 CONTAMINATION OF SURFACE WATER RESOURCE

As for groundwater contamination, leaks and spills from vehicles, machinery and handling of potential pollutants (e.g. fuel, and lubricants) during exploration activities in the field could potentially contaminate surface water resources. In addition, inadequate management of surface sumps could result in the contamination of surface water resources. The release of contaminants into water

resources could result in a deterioration of water quality, limiting use by water users, as well as damaging aquatic ecosystems.

Remarks: Exploration requires the use of vehicles and equipment driven by engines using hydrocarbons (normally diesel). Some of the equipment has hydraulic systems with lubricants. Certain hazardous lubricants and chemicals may also be used and stored on site. Thus leaks and accidental spillages could occur from containers or during refueling, which could in turn contaminate surface water resources through stormwater discharge into wetland, rivers and streams.

The overall volume of the high risk materials on-site during drilling/exploration would be relatively small (a maximum of 2 00 litres of diesel would be stored on site for each drilling operation). Although it is not possible to predict the quantities of potential contaminants that may be accidentally released into the environment, periodic leaks and spills, should they occur, are likely to be very small. Adequate maintenance of vehicles and machinery, use of drip trays, good housekeeping practices (including spill prevention and response) and the implementation of an adequate waste management plan would minimise any potential impact.

Returned drill water would be managed in above surface sumps. These surface sumps would thus also contain sediments, drilling fluids and possibly hydrocarbons at concentrations not suitable for release to the environment. Inadequate management of surface sumps could result in the contamination of surface water resources.

Aspects and Mitigation Measures:

- The key mitigation is to adjust the final drill site location to accommodate identified onsite environmental sensitivities such as already disturbed areas
- The location of the surface sumps should avoid surface water resources and should take the topography, natural drainage and site run-off into account;
- As a precautionary measure, implement a buffer (no-go area) between core boreholes / sump ponds and any surface water resources.
- An appropriate buffer will need to be determined;
- Adequate maintenance of vehicles and machinery;
- Good housekeeping practices (including spill prevention and response); and
- Implementation of an adequate waste management plan.

6.4 IMPACTS ON GROUNDWATER

The bulk of agricultural activities in the district of Omaruru where the project is located is predominantly dependent on groundwater. Some of the smaller towns operate municipal wellfields as a water source. Groundwater can, therefore, be viewed as a critical resource. Any changes to the quality or quantity of water in near surface aquifers may affect local, adjacent and even distant users who rely on groundwater for domestic and agricultural use.

6.4.1 ALTERED HYDROGEOLOGICAL REGIME AND GROUNDWATER AVAILABILITY

Borehole drilling would more than likely involve interaction with groundwater, which could have an impact on groundwater availability.

Remarks: This report assumes that core boreholes would be drilled to depths of up to 100 m and would intercept groundwater if aquifers are present. The drilling of the core hole creates a direct conduit (approximately 7.5 cm in diameter) that connects the rock strata from higher up to the bottom of the hole. Groundwater in different stratigraphic aquifers could theoretically flow via this conduit from one aquifer to another, potentially affecting the availability and quality of water in these aquifers. If a core hole is abandoned without proper plugging this flow could continue.

The key mitigation measure to protect and minimise potential risks to near surface aquifers is the casing-off of aquifers. The upper sections of the core holes is cased and cemented to depths below all potential aquifers, which would close off the near surface aquifers. Core holes would be capped pending further investigation or sealed with cement if not required further. In the case of sealing the borehole, a down hole cement plug is placed below all potential aquifers and the balance of the hole plugged with bentonite fluid. There would, therefore, be very little opportunity for cross connection between aquifers and changes in water availability are not expected.

Mitigation Measures:

Potential mitigation measures are:

- The final locations of exploration boreholes are flexible, they can be sited away from any environmental sensitive locations including groundwater. Hence the impacts on the groundwater can be generally avoided with the placement of activities outside of areas that are considered unsuitable on the specific groundwater resources on site.
- Casing of core holes through the aquifer layer.
- Adequate sealing and plugging of core holes after drilling is complete.

6.4.2 CONTAMINATION OF GROUNDWATER RESOURCES

Contamination of groundwater could occur as a result of the use of drilling fluids during core hole drilling, and accidental spillages and leaks.

Remarks: As indicated in the preceding section, the drilling of the core hole creates a direct conduit that connects the rock strata from higher up to the bottom of the hole. Groundwater in different stratigraphic aquifers could theoretically flow via this conduit from one aquifer to another, potentially affecting the quality of water in these aquifers.

Drilling of core holes require the use of some drilling fluids and lubricants in order to maintain cooling and lubrication of the bit and to return the fine drill cuttings to the surface. The drilling fluids used can mix with groundwater encountered down the hole until such time as the hole is cased and grouted. The upper aquifers can be exposed to the drilling fluids for the shortest periods as the upper section of the hole is cased and grouted early in the drilling process.

Drilling fluids are unlikely to have a significant effect on groundwater quality for the following reasons:

- the drilling additives used are largely not hazardous and / or are bio-degradable;
- drilling additives are relatively diluted in the drilling water (<3%);
- fluids are designed not to 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;
- the total volume of drilling fluids is very small in comparison with any aquifer volume; and
- return water and drilling fluid would be managed in above surface sumps.

Contaminants could also potentially enter the core hole from accidental situations, and could introduce directly into the aquifer with limited opportunity for natural filtration by soils or geological materials. Leaks and spills from vehicles, machinery and handling of potential pollutants (e.g. fuel and lubricants) during activities in the field could potentially contaminate groundwater resources through infiltration.

If a contamination incident occurs, it could put other boreholes in the same aquifer at risk, particularly those boreholes on the same property or those that are close to the core hole. Although it is not possible to predict the quantities of potential contaminants that may be accidentally released into the environment, periodic leaks and spills, should they occur, are likely to be very small. The placement of core holes at suitable buffer distances away from existing boreholes would further minimise the risk to those boreholes.

Mitigation Measures:

Mitigation to minimise the contamination of groundwater resources that will be considered for inclusion in the EMP include:

- Casing of core holes through the aquifer layers;
- Select the least hazardous and / or bio-degradable additives and use the smallest volumes of these;
- Appropriate management and disposal of drilling fluids on surface;
- As a precautionary measure, implement a buffer (no-go area) between core holes and active water production boreholes.
- An appropriate buffer would need to be determined;
- Adequate maintenance of vehicles and machinery;
- Implementation of an adequate waste management plan;
- Good housekeeping practices (including spill prevention and response), and
- Monitoring of groundwater in active water boreholes in close proximity to exploration boreholes.

6.5 WATER CONSUMPTION

Based on industry standard, about 5 000 litres (5 m^3) of water is required per day for diamond core drilling at an ideal site where drilling conditions are reasonably good and the rock formation solid. Therefore, the approximate volume of water required per drill hole over a four week period is in the order of 100 000 litres (100 m^3). The estimated water requirements to drill 40 core boreholes (10 core boreholes per mining claim) on the basis 20 work days per borehole is about 4 000 000 litres (4 000 m^3). This water consumption is, however, an over estimate because water for drilling is often recycled in an aboveground sumps.

At the district/farm level where this project is located, the estimated water requirements for the project is quite significant, when persistent drought and below average rainfall received, are taken into account. The use of groundwater may compete with existing users. The farm owner has confirmed that the existing boreholes on the property cannot deliver the water required for any drilling activities which leaves the promoter with the two options mentioned earlier. The first option is to drill an own water boreholes on the farm. The second option is to cart such water from either Omaruru (50 km) or Karibib (120 km).

Mitigation Measures:

Mitigation to minimise the contamination of groundwater resources that will be considered for inclusion in the EMP include:

- Water must be sourced in a lawful manner and without comprising the rights of any existing user;
- Any abstraction from an existing borehole or surface resource must be undertaken with the consent of the land owner; and
- Water separation / recycling mud systems must be considered for use in order to minimise water usage.

6.6 IMPACTS ON TOPSOIL

6.6.1 PHYSICAL IMPACT ON SOILS (INCREASED EROSION / COMPACTION)

The exposure of soils through 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 erosion.

Compacts to soils caused by the proposed core drilling activities would be limited to the footprint of each drill site area, which would be confined within the tenement of the mining claim held by the promoter. The bulk of exploration activities is confined to those areas of the mining claim that have been exposed to some form of disturbance already – existing roads will be used, hence minimal compaction and decreased risk of erosion should be expected. Industry standard is that a typical core drill rig and equipment will require an operating area of approximately 0.1 ha, hence the extent of soil exposed to these risks is very limited. The significance of this impact would be, to a large extent minimised, by the flexibility to select sites for any drilling work within previously disturbed areas.

Mitigation Measures:

Possible mitigation measures that will be considered for inclusion in the EMP include:

- Restricting vehicles to existing roads and tracks, as far as possible;
- Demarcation of drill sites in order to minimise the extent of any vegetation clearance / disturbance;
- Implementation of buffers (no-go areas) around sensitive areas;
- Rehabilitation of disturbed areas (including ripping compacted areas and erosion control measures)
- Maintaining a high standard of housekeeping (waste removal, no spills, etc.)

6.6.2 POTENTIAL CONTAMINATION OF SOILS

Leaks and spills from vehicles, machinery and handling of potential pollutants (e.g. fuel and lubricants) during on-site activities may potentially contaminate the soil.

Exploration requires the use of vehicles and equipment that use fuel. Some of the equipment has hydraulic systems with lubricants. Certain hazardous lubricants and chemicals may also be used and

stored on site. Thus leaks and accidental spillages could occur from containers or during refuelling, which could in turn contaminate the soil.

The overall volume of the high risk materials on-site during exploration period would be relatively small – not exceeding 200 litres of diesel. Although it is not possible to predict the quantities of potential contaminants that may be accidentally released into the environment, periodic leaks and spills, should they occur, are likely to be very small. Adequate maintenance of vehicles and machinery, good housekeeping practices (including spill prevention and response) and the implementation of an adequate waste management plan would minimise any potential impact.

Inadequate management of return drill water in surface sumps could also result in the contamination of surface water resources.

Mitigation Measures:

Possible mitigation measures that will be considered for inclusion in the EMP include:

- Adequate maintenance of vehicles and machinery;
- Good housekeeping practices (including soil prevention and response), and
- Implementation of an adequate waste management plan.

6.7 IMPACT FROM WASTE

Different types of wastes are produced during the exploration activities on all four mining claims, however, the volumes involved are small. Household waste such as plastics, bottles, cans, cartons, spoilt food, etc. and sleeping items old blankets, mattresses, sleeping bags, etc.
Hazardous waste associated with the handling of fuels, oil, greases, chemicals, plastics, and food items.
Poor waste management has these impacts:

- potential contamination of the campsite and surroundings;
- potential contamination of surface and groundwater sources;
- visual intrusion;
- health hazards, and
- amenity nuisance.

Waste generated by exploration activities can be effectively managed by implementing these measures:

- Keeping various types of waste separate at the campsite;
- Organic waste (food items, etc.) should not be fed to wildlife;
- Avoid wind dispersal of papers and plastics as it results in visual nuisance;
- Ensure that all machineries used in the operation are well maintained and not leaking;
- Use drip pans when re-fueling or changing oil & fuels; and
- Store used oil filters in leak-proof steel containers until disposed of.

6.8 FIRE HAZARDOUS

Of late, Namibia has been experiencing wildfires with over 2.5 million hectares reportedly destroyed by wildfires in 2021 alone (*The Namibia, 3 July 2023*). The frequency, intensity and extent of wildfires had been escalating across the country over the year due to a number of factors.

The frequency, intensity and extent of wildfires had escalated across the country since 2022 due to several factors, good rainfall received which resulted in the accumulation of high fuel-load in the veld combined with effects of the climate change. The impacts of any fire can be devastating resulting in damage to properties, destruction of habitats and even loss of life.

Management measures recommended in the EMP include the following:

- Ensure that exploration crew is given the basic training on how to combat wild fire.
- Avoid making open fire in the veld unless at designated areas of the campsite.
- Fire-fighting equipment should be readily accessible and kept in a good working order.
- No smoking should be allowed in areas where there is a fire hazard, i.e. near fuel storage area.
- Fire emergence procedures should established for the exploration crew at campsite.
- Clear a fire-break around the perimeter of the campsite if open fire is used.

6.9 HERITAGE

Exploration activities such as diamond core drilling and site access could potentially result in the loss of or damage to heritage resources. Many farms and communities in rural areas have graveyards located near to them. There are also many buildings, infrastructure and sites of cultural or heritage importance found across the Erongo Region.

Remarks: The heritage resources that include archaeological, palaeontological material (study of ancient life) and the built environment comprising of historic towns and farm buildings are protected resources in terms of the National Heritage Council of Namibia. Human graves would also fall under this category. When encountered during exploration or mining operations such resources should be protected and not be exposed to any activity that would result in their destruction or structural damage.

The amount of surface and subsurface disturbance is minimal during diamond core drilling. Cultural resources buried below the surface are unlikely to be affected, while material present on the surface could be disturbed by vehicular traffic, ground clearing and pedestrian activity.

Mitigation Measures:

Amongst the measures recommended in the EMP are:

- No diamond core drilling shall be allowed to take place near any known heritage sites.
- The final location of any exploration borehole should be sited away from any sensitivities.
- Consult with the landowner prior to commencement on any known heritage sites; and
- Implementation of buffers (no-go areas) around known heritage sites.

6.10 LAND TENURE AND ACCESS TO PRIVATE PROPERTY

Through pegging and registration of the four MCs on the commercial farm (Omapyu Süd), the promoter is holding a mineral right to explore and to mine those minerals registered on the MCC.

Remarks: The right which the mining claim holder has is subject to the promoter negotiating and securing access right to the private property. It should be noted that the promoter has held the mining claims on the same property since 2007 or for a period of 17 years and has therefore a standing agreement with the landowner to undertake SPS mining activities. The amendment to the ECC to allow the addition of IGM on the MCC and the subsequent exploration and exploitation of such minerals will therefore not negate the land tenure of the landowner. New terms may have to be negotiated with the landowner regarding access for the new employees.

The proposed exploration will be conducted on the existing mining claims. The number of diamond core boreholes to be drilled will be on those MCs. The location of such boreholes will be determined by the promoter as informed by the findings of this scoping assessment and the EMP.

Access would largely be through existing routes and gates. New tracks would only be created in agreement with the landowner. Controlled access points would be locked at all times or as required by the landowner.

6.11 LAND USE

Exploration activities such as drilling would preclude other land uses (e.g. farming, hunting, game viewing, etc.) within the immediate exploration area for the duration of the drilling period. Potential impacts include:

- prevention or disruption of land user' activities;
- impacts on trophy hunting activities;
- impacts on game viewing and or livestock farming activities;
- potential loss of income, and
- potential loss of productivity on disturbed land.

Remarks: In order to minimise ecological impacts, any core boreholes that have to be drilled will be located within those areas of the mining claims that have been previously disturbed. Since the core hole drill sites would be limited to a footprint of approximately 0.1 ha for a period of three to four weeks, any loss of land for existing activities would be highly localised and temporary.

Key mitigation is to avoid or minimise any impacts on existing land use is to ensure that the final location of core drilling sites is undertaken in consultation with landowner. This would ensure that conflicting land uses are avoided where possible and disturbance to current land use activities are kept to a minimum. As mentioned above, exploration activities would be undertaken in terms of a

written landowner agreement, and measures to ensure that any interference is avoided or minimised would be written into a revised agreement drawn up with the landowner.

All disturbances occurring from exploration activities will be documented and the affected area returned to an agreed condition post drilling. In most cases the effects of any disturbance would more than likely not be visible over a period of a few months.

Mitigation Measures:

Among the management measures that would be recommended in the EMP are:

- Demarcation of drill sites in order to minimise the extent of the drilling footprint and to ensure livestock and wildlife are kept away from exploration activities;
- Any loss of income would be determined between the landowner and the promoter and compensation accordingly agreed.
- Ensure adequate consultation with the landowner prior to and during on-site exploration activities; and
- Rehabilitate disturbed areas to re-establish the pre-exploration land use (in consultation with landowner)

6.12 Structural Damage to Infrastructure

Accidental damage during exploration activities could occur as vehicles and equipment move on and between sites. Such damage to infrastructure (such as fences, gates, pipes and internal routes,) would have direct cost of repair / replacement, as well as potential for significant loss of income due to the effects of such damage.

Remarks: As noted previously, any use of land or infrastructure for exploration work including any drilling activities would be through a written landowner agreement negotiated between the parties. The mining claim holder has had a relationship with the landowner spanning over 17 years (since 2007 when the mining claims were first pegged and registered). Thus the landowner should have input into where exploration takes place and which infrastructure is used.

Exploration would typically be planned to be located away from infrastructure and appropriate buffers would be applied. Any risks with regard to accidental damage can be minimised by maintaining a suitable buffer between the exploration site and the nearest receptor. Ultimately, if access by exploration personnel and equipment caused any degradation or damage, the mining claim holder will be responsible for any repair costs to the satisfaction of the landowner.

6.13 Noise Pollution

Primary sources of noise associated with the proposed exploration activities include vehicle traffic and drill rig operations. Increased noise levels may cause disturbances and nuisance to nearby receptors. The district generally has low ambient noise levels and exploration activities could change this, albeit for short durations.

Drilling of core holes would increase noise levels in the immediate vicinity for a slightly extended time period (possibly four weeks per mining claim), which could have an impact on nearby receptors. Noise is known to attenuate with distance as well as due to other barriers and absorbing factors. The noise generated by general operations (presence of vehicles and crew) would be similar in nature to farming operations, and would be transient, with activities not fixed in one location

Potential noise impacts related to any exploration drilling activities can largely be avoided by maintaining a suitable buffer between exploration sites and the nearest receptor.

Further measures are provided in the EMP.

6.14 Air Quality

6.14.1 Dust and Gaseous Emissions from Vehicles

Dust generated from the movement of vehicles to and from exploration sites on gravel roads and core drilling operation may contribute to elevated particulate matter levels in the air on a district scale. Emissions would also be generated by vehicles and other combustion-driven equipment (e.g. generators) that release nitrogen oxides (NO_X), carbon dioxide (CO_2), carbon monoxide (CO) and volatile organic compounds (VOC).

Dust is relatively inert, but high particulate levels can be damaging to health and vegetation / crops. In terms of dust generation and emissions, the proposed exploration activities would be similar to any comparable operation involving similar vehicles and equipment and emissions would be very limited in both intensity and duration.

Dust generation can be controlled by imposing and enforcing speed limits on all gravel roads and tracks. The impact on air quality from core drilling activities would be managed through good maintenance of vehicles and machinery to minimise emissions. Note that spraying affected areas with water to control dust may not be possible or allowed due to water scarcity.

6.14.2 Escape or Release of Gas from Exploration Boreholes

Core holes drilled to the target strata could create the opportunity for any gas present to escape to the surface and ultimately into the atmosphere. The escape or release of gas from exploration core holes is of concern as methane is a relatively powerful green-house gas with a high global warming potential (23 times that of CO_2).

Remarks: If gas is present, the passive flow of gas up the core holes is expected to be limited as the strata remain under pressure and much of the gas is adsorbed to the particle surfaces. The pressure in the formation may need to be reduced (through dewatering) in order for the gas to be released. However, if gas does leak out the borehole, it could pose a safety risk and contribute to greenhouse gas emissions.

Core holes would only be open for a period long enough to complete the drilling and downhole geophysics. If free flowing gas were to be detected then the holes would need to be capped or plugged as a priority, which would ensure that no gas escapes. Thus emissions are not anticipated to have a measurable impact on climate change.

6.15 Landowner Security

There may be concerns that the increased numbers of people in the area as a result of the proposed exploration activities could have an impact on farm safety and security, either through direct theft by contractors and staff or through undeterred access onto private land through gates that are left open.

Remarks: Concerns regarding site access, trespassing and farm security as a result of exploration teams would be alleviated by controlling access to the mining claims where exploration is taking place. All access to land for exploration activities would have to be through a written landowner agreement. Thus any additional landowner requirements with regard to safety and security can be discussed during landowner negotiations prior to the start of exploration and written into the existing agreements with each landowner, as required.

Mitigation to minimise the risks to landowner security that will be considered for inclusion in the EMP include:

- Avoiding the creation of new access points to the farm, as far as possible;
- Ensuring the staff are under constant supervision and do not enter adjacent farms under any circumstances except on official business; and
- Ensuring all gates are closed / locked.

6.16 Visual Impacts

By their very nature mining operations, and in particular surface mining activities can often result in negative impacts to the resources associated with the landscape uses such as tourism. Potential contributions to visual impact include waste rock dumps, processing plant structures, mining equipment, huge machinery, workshops, lighting at night, etc.

Exploration operations should be planned to prevent and minimise negative visual impacts by incorporating visual impact assessment at the pre-feasibility stage to ensure that proximity to public viewpoints are avoided. The mining claims where exploration will be conducted is in close proximity to C36 which connects Wilhelmstal to Omaruru – a road used by many tourists.

Rehabilitation should, to the extent possible, conform to the visual aspects of the surrounding landform.

6.17 Socio-economic Impacts

6.17.1 Employment Creation

Since economic growth and employment opportunities are depressed in many areas of the country, any potential stimulation of the local economy would result in a positive impact. However, since exploration is highly technical and requires specialised equipment and crews, it is anticipated that the appointed contractor would provide their own staff requirements. Thus, local communities are unlikely to benefit from any direct job opportunities. Long term, this scenario has the potential to change if a mineral deposit is discovered which can be mined commercially. A mining operation will generally employ many people.

6.17.2 Boost to the Local Economy

Local companies have the necessary exploration skills and it is expected that a local contractor/company will be hired for the job. There is be some stimulation of the local economy through the purchase of supplies and equipment over the duration of exploration period. The successful contractor should, wherever possible, source the materials and equipment needed to operate the drilling equipment and sustain the personnel locally.

6.17.3 Skills and Technology Transfer Creation

Whilst exploration is a specialised field, it is recommended that, whenever possible, opportunities for employment should be given to the local youths with suitable qualifications to help them acquire the necessary skills and technology.

7 ASSESSMENT OF POTENTIAL IMPACTS

7.1 ASSESSMENT DESCRIPTION

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 section of the report. Where positive impacts are derived from any 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 over a period of 24 months. Historically, the pegmatite around the Karibib district have been mined for lithium oxides when demand for the metal was strong.

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.

7.2 ASSESSMENT CRITERIA

7.2.1 IMPACT ASSESSMENT METHODOLOGY

The impacts listed in **Table 5** were assessed in terms of the probability or the likelihood of such an impact actually occurring, scale or extent (spatial scale), magnitude (severity) and duration (temporary scale). Numerical values were then linked to each rating scale which enabled a scientific approach to the be used to determine the environmental significance of an impact.

The identification and assessment of environmental impacts in a multi-faceted process using a combination of quantities and qualitative descriptions and evaluations. It involves applying scientific measurements and professional judgement to determine the significance of environmental impacts associated with the proposed exploration and prospecting activities with the EPL application area. The process involves consideration, of inter alia: the purpose and need for the project, views and concerns of IAPs, social and political norms and general public interest.

7.2.2 DESCRIPTION OF IMPACTS

An impact is described in terms of its nature, extent, duration, intensity and compliance with applicable legislation and accepted standards, receptors sensitivity and significance of the predicted environmental change (before and after mitigation). Mitigation measures may be existing measures or additional measures that were identified through the impact assessment and associated specific input. The impact rating system considers the confidence level that can be placed on the successful implementation of mitigation.

7.2.3 IMPACT EVALUATION CRITERIA

The method proposed for the assessment of environmental impacts associated with exploration activities within the mining claims is set out in **Table 9** below. In the assessment methodology consideration has been given to the rating scales when assessing potential impacts (before and after mitigation measures)

- consequence, which is a function of:
  - the intensity of impacts (including the nature of impacts), and
  - the degree to which impacts may cause irreplaceable loss of resources.
- the extent of the impact;
- the duration of the impact,
- probability of the impact occurring,
- reversibility of the impact, and
- degree to which impact can be mitigated.

Table 9: Criteria for Assessing Impacts

Notes:

Part A:
Provides the definition for determining impact consequence (combining intensity, spatial scale and duration) and impact significance (overall rating of the impact.

Part B & C:
Impact consequence and significance are determined.

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

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.
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	Potential flaw unless mitigated to lower significance
High	It must have an influence on the decision. Mitigation will be required.
Medium	It should have an influence on the decision. Mitigation will be required
Low	Unlikely that it will have a real influence on the decision. Limited mitigation is likely to be required.
Very Low	It will not have an influence on the decision. Does not require any mitigation.

7.3 ASSESSMENT OF IDENTIFIED IMPACTS

The potential impacts associated with the proposed activity are listed in Table 7, below and their assessments presented in **Tables.** Management measures on how the identified environmental impacts could be reduced, eliminated or minimised are provided in the EMP.

The alternative(s) for environmental impacts and risks of the project have been compared for the purpose of selecting the preferred alternative(s). The assessment of potential impacts has been informed by onsite evaluations of disturbances arising from mining activities conducted on all four mining claims since 2007. The assessment ratings provided in **Table 9** are for the unmitigated scenario only which assumes that limited consideration is given to the prevention or reduction of environmental and social impacts. In most cases the alternative would be the mitigation. Furthermore, a conservative approach has been applied to these ratings.

A summary of the assessment of project alternatives is provided below:

The bulk of the impacts associated with the preferred project alternatives would be of short-term duration and limited to the immediate exploration site, and are considered to range from **VERY LOW (VL)** to **LOW (L)** significance.

Potentially, the most significant impacts which have been assessed with the preferred project alternatives that have **MEDIUM** significance without mitigation are summarized here:

- Siting of the maintenance yard outside the mining claims,
- Leaving the maintenance yard unfenced with free access to all and sundries,
- Not developing a waste management plan for exploration work,
- Siting exploration boreholes in undisturbed areas of each mining claim,
- To explore and to drill boreholes in undisturbed sites near water courses,
- Using non-hazardous biodegradable drilling fluids with aboveground skips,
- Non recycling of water used for drilling in aboveground sumps,
- Inadequate training of exploration crew on the heritage and cultural resources, etc.

With mitigation measures, the significance ratings for these impacts will be **LOW (L)** to **Very Low (VL).**

The impacts associated with exploration which have **MEDIUM** to **HIGH** significance ranking without mitigation are:

- If the drilled boreholes remain unplugged or uncapped there is a possibility for the release of harmful gaseous emissions (e.g. methane, etc.) into the atmosphere.
- Poor management of hazardous waste (e.g. oil leaks, spills, etc.) including storage and disposal thereof.
- Employees entering the farm any time without proper identification or employees who may involve in illicit activities such as illegal hunting, poaching or cutting down trees to collect firewood and fire hazards.

Table 10: Potential Environmental and Social Impacts Identified for the Proposed Alternatives

Impact	Alternative	Consequence			Probability	Significance	Degree to which impact		
		Intensity	Extent	Duration			Can be Reversed	Causes irreplaceable Loss	Can be avoided/ managed/ mitigated
On Maintenance Yard									
Loss of vegetation and faunal habitats	Locate maintenance yard within the mining claim on land that been disturbed already. (recommended)	L	VL	VL	L	**VL**	Partially reversible	Unlikely	Yes
	Locate maintenance yard outside mining claim and on undisturbed land (not recommended)	M	VL	L	M	**M**	Partially reversible	Likely	Yes
Ensure that maintenance yard is safe and secured	Fence the maintenance yard and limit access (recommended)	VL	VL	VL	L	**L**	Fully reversible	Unlikely	Yes
	Leave maintenance yard unfenced with free access (not recommended)	M	L	VL	L	**M**	Fully reversible	Potential	Yes
Leaking and spill of hazardous products (fuel, oil, grease, etc.	Perform repairs and servicing of machinery on impervious surfaces (recommended)	VL	VL	L	L	**VL**	Full reversible	Potential	Yes
	Perform repairs and servicing on pervious surfaces (not recommended)	M	L	L	M	**L**	Partially reversible	Potential	Yes
Access routes to exploration sites	Use existing routes within the mining claims to access exploration sites (recommended)	VL	VL	VL	L	**VL**	Fully reversible	Unlikely	Yes
	Make new routes to access exploration sites (not recommended)	L	L	VL	M	**L**	Fully reversible	Unlikely	Yes
Waste handling at the maintenance yard	Develop a waste plan for the exploration work at the maintenance yard (recommended)	VL	VL	VL	L	**L**	Fully reversible	Potential	Yes
	Do not develop a waste plan for exploration work (not recommended)	L	L	L	M	**M**	Partially reversible	Likely	Yes
On the Ecosystem									
Loss of or disturbance to vegetation and faunal habitats	Explore and site drill boreholes in previously disturbed sites of the mining claim (proposed)	L	VL	VL	M	**L**	Fully reversible	Very unlikely	Yes
	Site exploration drill boreholes in undisturbed site of the mining claim (not proposed)	M	VL	L	H	**M**	Partially reversible	Possible	Yes
On Surface Water									
Altered surface water hydrogeological regime and availability	Explore and site drill boreholes in previously disturbed sites away from watercourses (proposed)	VL	VL	VL	VL	**VL**	Fully reversible	Very Unlikely	Yes
	Explore and drill in undisturbed sites near water courses (not proposed)	M	VL	M	M	**M**	Partially reversible	Possible	Yes
Contamination of surface water resources	Use of non-hazardous biodegradable drilling fluids with above ground skips (proposed)	M	VL	M	M	**M**	Fully Reversible	Unlikely	Yes
	Use of non-aqueous drilling fluids (oil based) with no skips (not proposed)	L	VL	VL	M	**L**	Partially Reversible	Possible	Yes
Water consumption	Recycling of water in above ground skips	L	M	VL	L	**L**	Fully reversible	Unlikely	Yes
	No recycling of water	M	M	VL	L	**M**	Fully reversible	Unlikely	Yes
On Groundwater									

Impact	Alternative	Consequence			Probability	Significance	Degree to which impact		
		Intensity	Extent	Duration			Can be Reversed	Causes irreplaceable Loss	Can be avoided/ managed/ mitigated
Altered hydrogeological water regime and groundwater availability	All alternatives (exploration sites and drilling methods)	M	M	VL	L	**M**	Partially to fully reversible	Possible	Yes
Contamination of groundwater resources	Use of non-hazardous biodegradable drilling fluids (recommended)	L	VL	VL	M	**L**	Partially to fully reversible	Unlikely	Yes
	Use of non-aqueous or oil based drilling fluids (not recommended)	M	M	L	M	**M**	Partially to fully reversible	Unlikely	Yes
Water consumption	Recycling of water in aboveground skips (recommended)	L	M	VL	L	**L**	Fully reversible	Unlikely	Yes
	No recycling of water in aboveground (not recommended)	M	M	VL	L	**M**	Fully reversible	Unlikely	Yes
On Soil									
Physical impacts on soil including compaction (leading to increased erosion)	All alternatives	VL	VL	VL	L	**L**	Partially to fully reversible	Unlikely	Yes
On Heritage									
Loss of or damage to unknown heritage resources	Training of crew on what to do when heritage items are found (recommended)	L	VL	VL	L	**L**	Partially reversible	Unlikely	Yes
	No training provided to exploration crew on heritage items (not recommended)	M	M	L	L	**M**	Irreversible	Possible	Yes
On Land Tenure									
Change in land tenure	All alternatives	No impacts							
On Land Use									
Preclusion of other land uses	Mining claims already pegged with approval of landowner. Consult on exploration activities (recommended)	M	VL	VL	L	**L**	Fully reversible	Unlikely	Yes
	Mining claims already pegged with consent of landowner Do not consult on exploration. (Not recommended)	H	VL	VL	M	**M**	Fully reversible	Unlikely	Yes
Accidental Damage to Infrastructure									
Accidental damage during exploration work and drilling activities	All alternatives	VL	VL	VL	L	**L**	Fully reversible	Unlikely	Yes
On Noise									
Increased noise levels may cause disturbances and nuisance to sensitive receptors	Determine any drilling sites in consultation with landowner (recommended)	VL	VL	VL	VL	**VL**	Fully reversible	Unlikely	Yes
	Determine drill sites without consultation (not recommended)	M	M	VL	M	**M**	Fully reversible	Unlikely	Yes
On Air Quality									
Dust and vehicular emissions	All alternatives	L	VL	VL	L	**L**	Fully reversible	Unlikely	Yes
Escape or release of gas from exploration boreholes	Plug borehole /cap after drilling (proposed)	VL	VL	VL	VL	**VL**	Partially reversible	Unlikely	Yes
	No plugging or capping of boreholes after drilling (not recommended)	H	H	VH	H	**H**	Partially reversible	Unlikely	Yes
From Waste									
Handle waste generated during the exploration activities effectively	Provide separate storage containers for solid and hazardous waste (recommended)	VL	VL	VL	L	**L**	Fully reversible	Unlikely	Yes

Impact	Alternative	Consequence			Probability	Significance	Degree to which impact		
		Intensity	Extent	Duration			Can be Reversed	Causes irreplaceable Loss	Can be avoided/ managed/ mitigated
	Do not separate waste as solid and hazardous (not recommended)	L	VL	L	M	**M**	Partially reversible	Likely	Yes
Fire Hazardous									
Develop a hazardous waste plan for the exploration	Store hazardous waste in secure and leak-proof metal containers	VL	VL	L	L	**VL**	Fully reversible	Potential	Yes
	Store hazardous waste in unsecure and in any type of containers	M	M	L	M	**H**	Partially reversible	Likely	Yes
	Dispose hazardous waste at an approved offsite landfill facility	VL	VL	L	L	**VL**	Partially reversible	Unlikely	Yes
	Dispose hazardous waste anywhere on the farm	M	M	L	M	**H**	Partially reversible	Likely	Yes
Landowner Safety and Security									
Access and number of employees working on the mining claims should be agreed with landowner	Employees entering the property must be identifiable and access times agreed with landowner (recommended)	L	VL	VL	L	**L**	Partially reversible	Unlikely	Yes
	Employees entering the property any times without any means of identification (not recommended)	M	M	VL	L	**H**	Irreversible	Possible	Yes
Socio-economic Impacts									
Employment creation	Offer employment to local Namibians	M+	H	L	L	**H+**	N/A	N/A	YES
	Offer employment opportunities to anyone including non-Namibians	L+	M	L	VL	**M**	N/A	N/A	YES
Transfer of technical skills	Provide training to new employees to acquire new skills	M+	M	L	L	**M+**	N/A	N/A	Yes
	Do not provide training to employees to acquire new skills	L	M	L	VL	**L**	N/A	N/A	Yes
Health and safety	Provide suitable PPE and adequate sanitation	VL	L	VL	L	**VL**	N/A	N/A	Yes
	Do not provide PPE and provide inadequate sanitation	L	L	VL	L	**L**	N/A	N/A	Yes
Contribution to the local economy	Pay tax and VAT due to NamRa	M+	L	VL	VL	**M+**	N/A	N/A	Yes
	Do not pay tax and VAT to NamRa	H	L	VL	VL	**M**	N/A	N/A	Yes

7.4 IMPACT MANAGEMENT OBJECTIVES AND OUTCOMES

Impact management objectives and outcomes will be provided in the EMP section of the scoping assessment report to ensure that proposed exploration operation on the four mining claims is carried out in a manner that is sustainable without any significant negative impacts. A summary of the management objectives is provided below:

- That all the planning related to the exploration is undertaken responsibly and in a manner that takes the protection of the environment.
- That environmental awareness creation and training is undertaken throughout the duration of exploration activities.
- That a safe working environment for the exploration crew and public is provided on one of the mining claims.
- That all exploration support infrastructure (maintenance yard & access routes) is sited on disturbed sections of one of the mining claims and that use is made of existing routes to access exploration sites.
- Ensure that the maintenance yard is secured (fenced in) and that access control is in place.
- That proper management of labour force is undertaken to ensure that:
    - There are security-related issues or disturbance to landowner outside the footprint of the mining claims.
    - That there is no disturbance to sensitive environmental feature.
- That adequate ablution facilities is provided and kept clean and tidy at all times.
- That solid waste generated throughout the duration of the exploration operation is handled, stored and disposed of in a responsible manner.
- That any hazardous waste generated throughout the duration of the exploration operation is stored in leak-proof containers and disposed at an approved landfill site.
- Minimal environmental impacts associated with the management of maintenance yard, machinery and equipment.
- To ensure that all possible causes of pollution are mitigated as far as possible to minimise impacts to the surrounding environment.
- Prevent polluted water from entering the natural environment.
- Minimise noise disturbance to the surrounding areas.
- Control alien vegetation and noxious weeds from entering the exploration sites.
- Minimise impact to fauna without poaching of wildlife.
- Preservation and appropriate management of any findings of heritage resources should these be discovered during the exploration activities.
- That adequate rehabilitation of exploration sites is done after exploration.

7.5 ASSUMPTIONS, UNCERTAINTIES AND LIMITATIONS

This scoping assessment is based on a number of uncertainties and assumptions which are summarised here:

- The information provided to the EIA Consultant by the promoter/SSM is to explore for IGM on the four mining claims and to mine for such IGM if found in commercial quantities. In the absence of a defined mineral deposit, it is not possible to estimate the volumes and or tonnage that will be mined.
- The promoter /SSM has discovered traces of lithium, tantalite and tin in the waste rock generated while mining SPS. The exploration is essentially meant to confirm if there are IGM on the mining claims that can be mined economically. This information is assumed as correct.
- It has been assumed that a minimum of ten diamond core boreholes per mining claim will be drilled which makes it forty (40) boreholes. It is projected that the duration of exploration will be accomplished within 24 months which ties in with the two year tenure of a mining claim. This information is assumed to be correct.

- In the event that the exploration exercise confirms a deposit of IGM on the mining claims that can be mined commercially, it is assumed that the EMP will have to be updated to provide for mining activities based on the size of the mineral deposit, characteristics of the deposit, proposed mining scale and processing parameters.

- The assessment of significance of impacts on the affected environment has been, primarily, based on the exploration activities and that such exploration activities will be confined to those four mining claim held by the promoter.

- It is further assumed that the promoter (Jeano Foelscher) and his associates/partners will in good faith implement the recommended mitigation measures identified for the exploration phase, commit sufficient resources, employ suitably qualified and experienced personnel to carry out the exploration work and will ensure compliance with the ECC.

Notwithstanding the above, Ekwao is confident that the above assumptions and limitations do not compromise the overall findings of the report.

8 CONCLUSION AND RECOMMENDATION

8.1 CONCLUSION

Namibia has a long history of mining with operations ranging from large scale (NamDeb, Rossing, Husab, etc), medium scale (Navachab, Scorpion, Rosh Pinah Zinc, B2B Gold, etc.) and small scale (Namibia Marble & Granite, Namib Lead & Zinc Mining, etc). The mining sector is therefore a vital sector to the Namibian economic with an annual contribution to GDP of about 10%, the biggest foreign exchange earner and employing about 8 200 people (Chamber of Mines, 2022, annual report) in 2022 . The proposed project will fall under the small scale category.

Tourmaline mining by small scale miners has been conducted in the area for a number of years and vast areas excavated and left open without any rehabilitation. The envisaged project is a formal exploration operation undertaken by an experienced small-scale miner who is well-resourced to undertake the proposed activities. Based on the assessment of both negative and positive impacts undertaken for the proposed project, the positive impacts do indeed outweigh the negative impacts at the local, regional and national levels.

It is therefore the conclusion of EIA Consultant that all significant impacts identified during the environmental scoping assessment can be effectively mitigated if the management actions recommended in the EMP section of the report are effectively implemented during the exploration phase.

8.2 RECOMMENDATIONS

Based on the findings of the environmental scoping assessment, it is recommended that the ECC granted to Mr Jeano Foelscher (proponent) be amended to allow for exploration activities on the same four mining claims with these numbers: MC-67922, MC-67923, MC-68561 and MC-68562 with these terms and conditions:

- That the general terms and conditions attached to the four MCs by the Mining Commissioner are complied with.
- That the proponent concludes a revised access agreement with the landowner prior to starting with exploration activities.
- That the proponent and his associates commit themselves to rehabilitate both new and old workings on all four mining on completion of exploration activities claims to the satisfaction of the landowner.
- That exploration activities must be undertaken within a period of 24 months from the renewal date of the mining claims.
- That compliance reports be prepared and submitted to MEFT on a bi-annual basis.
- That accurate exploration reports are prepared and submitted to the line ministry (MME) as requiredby the Minerals Act.

9 REFERENCES:

- **Lithium,** BGS, July 2016
- **Lithium Potential in Namibia, Evaluation of Economic Suitability,** Bundesantalt fur 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 Bredding 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.areva.com Bitter A (2010) Ground Water Specialist Report to the EIA: Improved water supply to the Langer Heinrich Mine