

Environmental Scoping Assessment (ESA) Study Report:

For Proposed Exploration and Small-Scale Mining Activities on Eight (8) Mining Claims No. 74188 - 74195 North of Karibib in Erongo Region, Namibia- An Application for Environmental Clearance Certificate (ECC)



MEFT Application No.:

APP-01423

Document Version:

Final for Submission

Proponent:

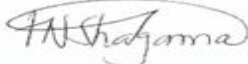
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June 2023

DOCUMENT INFORMATION

Title: Environmental Scoping Assessment (ESA) Study Report for Proposed Exploration and Small-Scale Mining Activities on Eight (8) Mining Claims No. 74188 - 74195 North of Karibib in Erongo Region, Namibia - An Application for Environmental Clearance Certificate (ECC)

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SERJA' STATEMENT OF INDEPENDENCE

As the Appointed Environmental Consultant to undertake the Environmental Scoping Assessment (ESA) Study for the Proposed Exploration and Small-Scale Mining Activities on Eight (8) Mining Claims No. 74188 - 74195 North of Karibib in Erongo Region, Serja Hydrogeo-Environmental Consultants cc declare that we:

- do not have, to our knowledge, any information or relationship with Ndawanenwa Mineral Exploration CC (the Proponent) or its members, the Ministry of Environment, Forestry and Tourism (MEFT)'s Department of Environmental Affairs and Forestry (DEAF) or the Competent Authority (Ministry of Mines and Energy (MME) that may reasonably have potential of influencing the outcome of this Environmental Assessment and the subsequent ECC applied for.
- have knowledge of and experience in conducting environmental assessments, the Environmental Management Act (EMA) No. 7 of 2007 and its 2012 Environmental Impact Assessment (EIA) Regulation as well as other relevant national and international legislation, guidelines, policies, and standards that govern the proposed project as presented herein.
- have performed work related to the ECC application in an objective manner, even if the results in views and findings or some of these may not be favorable to the Proponent.
- have complied with the EMA and other relevant regulations, guidelines and other applicable laws as listed in this document.
- declare that we do not have and will not have any involvement or financial interest in the undertaking/implementation of the proposed project, other than remuneration (professional fees) for work performed to conduct the ESA and apply for the ECC in terms of the EIA Regulations' requirement as an Environmental Assessment Practitioner (EAP).

Disclaimer: Serja Hydrogeo-Environmental Consultants will not be held responsible for any omissions and inconsistencies that may result from information that was not available at the time this document was prepared and submitted for evaluation.



.....
Signature:

Fredrika N. Shagama: Principal Environmental Assessment Practitioner & Hydrogeologist

Date: June 2023

EXECUTIVE SUMMARY

Ndawanenwa Mineral Exploration CC (hereinafter referred to as the Proponent) has applied to the Ministry of Mines and Energy (MME) on the 27th of February 2023 to be granted the rights explore and at a small-scale, mine Industrial Minerals (lithium) on eight (8) Mining Claims (MCs) No. 74188, 74189, 74190, 74191, 74192, 74193, 74194 and 74195 (hereinafter collectively referred to as MC74188 – 74195).

The MCs are located on Farm Daheim No. 106, about 15km north of Karibib in the Erongo Region. The eight MCs cover a combined area of 118.225 hectares (Ha).

For MME to consider the granting of the exploration and mining rights on the MCs, the Proponent is required to obtain an Environmental Clearance Certificate (ECC) and submit to the MME.

Proposed Project Activities

Exploration

The approach for two exploration of the commodity will be carried out as per the following methods as listed below and presented under the subsections below.

- Geological mapping (Non-invasive technique) and geophysical surveys (data collection of the substrata).
- Lithological(soil and rock) sampling (invasive technique)
- Drilling programmes (invasive technique): Should analyses of soil/rock samples by an analytical laboratory be positive, holes are drilled, and drill samples collected for further analysis.

The anticipated drilling method will be Reverse Circulation (RC) and diamond-core drilling RC. The technique produces an uncontaminated large volume sample, which is comprised of rock chips. It is relatively quicker and cheaper when compared to other techniques like Diamond Drilling. However, diamond drilling may also be considered for this exploration programme, for better geological control and to perform processing trials.

Mining of Industrial Minerals

During this phase, extraction (mining) of industrial minerals and all associated mining activities will be carried using the traditional mining method (ore mining from hard rock). Both invasive and non-invasive activities as in the exploration stage will be implemented to recover the industrial mineral (lithium) ore. Non-invasive activities include detailed mapping, and invasive activities will involve trenching/pitting and drilling for an open pit mining.

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

It should be noted that there will be no ore processing onsite.

Communication with I&APs, and Means of Consultation Employed

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

- A Background Information Document (BID) containing brief information about the proposed project was compiled and hand delivered to the Ministry of Mines and Energy (MME) accompanying the ECC application, and uploaded on the MEFT (ECC) Portal for project registration. The BID was also shared with the I&APs who requested for it.
- Project Environmental Assessment notices were published in The Namibia Media Holdings' *Market Watch* newspapers (*Allgemeine Zeitung, Die Republikein, and Namibian Sun*) dated 30 March 2023 and 05 April 2023, briefly explaining the activity and its locality, inviting members of the public to register as I&APs and submit their comments/concerns.
- The 8 MCs are located on a private farm. Therefore, there was no consultation meeting held. The only consultation done was with the farm owner who have provided consent for the proposed activities.
- Printed copies of A3 size posters were pasted at the Karibib Town Council, Karibib Constituency, and Woermann Brock Supermarket notice boards in Karibib.

Public Consultation and Participation Period

The public consultation which entailed the submission of comments and registration as I&APs started on the 30th of March 2023 until the 02nd of May 2023. There were no comments submitted to Serja during the consultation period.

Potential impacts, description and assessment

Some key potential positive and negative impacts were identified. These were described, assessed and appropriate management and mitigation measures made thereof for implementation by the Proponent, their contractors, and workers to avoid and/or minimize their significance on the environmental and social components. The potential negative impacts assessed have a medium rating significance. The effective implementation of the recommended management and mitigation measures accompanied by monitoring will greatly aid in minimizing the significance of adverse impacts that cannot be avoided completely (from medium rating to low). The implementation of measures to maximize the positive impacts will also increase the significance during exploration and mining stages.

Conclusions

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

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

- All the management and mitigation measures provided herein are effectively and progressively implemented and monitored.
- All required permits, licenses and approvals for the proposed activities should be obtained as required. These include permits and licenses for land access agreements, services provision agreements to explore and ensuring compliance with these specific legal requirements.
- The Proponent, their project workers or contractors comply with the legal requirements governing their project and its associated activities and ensure that project permits and or approvals required to undertake specific site activities are obtained and renewed as stipulated by the issuing authorities.
- Site areas where exploration and mining activities have ceased are rehabilitated, as far as practicable, to their pre-exploration state. This includes the levelling of stockpiled topsoil, backfilling of trenches and closing/capping of exploration holes.

To maintain the desirable rating and that the potential impacts are under control, the implementation of management and mitigation measures should be monitored by their Environmental Control Officer (ECO) and audited by an Independent Environmental Consultant on a bi-annual basis. The monitoring of this implementation will not only be done to maintain the reduce impacts' rating or maintain low rating but to also ensure that all potential impacts that might arise during implementation are properly identified in time and addressed immediately.

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Appendix B: Draft Environmental Management Plan (EMP) - uploaded separately on the Portal as required

Appendix C: EIA Notification in the newspapers: *Allgemeine Zeitung, Die Republikein & Namibian Sun* and public notices - uploaded separately on the Portal as required (under "Proof of Public Consultation" file)

Appendix D: Communication from some I&APs and Serja Response - uploaded separately on the Portal as required (under "Proof of Public Consultation" file)

LIST OF ABBREVIATIONS

Abbreviation	Meaning
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
DEAF	Department of Environmental Affairs and Forestry
EAP	Environmental Assessment Practitioner
ECC	Environmental Clearance Certificate
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental Management Plan
ESA	Environmental Scoping Assessment
GG	Government Gazette
GN	Government Notice
I&APs	Interested and Affected Parties
IFC	International Finance Corporation
MAWLR	Ministry of Agriculture, Water and Land Reform
MCs	Mining Claims
MEFT	Ministry of Environment, Forestry and Tourism
MME	Ministry of Mines and Energy
NHC	National Heritage Council (NHC) of Namibia
PPE	Personal Protective Equipment
Reg	Regulation
S	Section

GLOSSARY (KEY TERMS) AS ADOPTED FROM EXCEL DYNAMIC SOLUTIONS

Term	Definition
Alternative	A possible course of action, in place of another that would meet the same purpose and need of the proposal.
Baseline	Work done to collect and interpret information on the condition/trends of the existing environment.
Biophysical	The part of the environment that does not originate with human activities (e.g., biological, physical and chemical processes).
Cumulative Impacts / Effects Assessment	In relation to an activity, means the impact of an activity that in it may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.
Decision-maker	The person(s) entrusted with the responsibility for allocating resources or granting approval to a proposal
Ecological Processes	Processes which play an essential part in maintaining ecosystem integrity. Four fundamental ecological processes are the cycling of water, the cycling of nutrients, the flow of energy and biological diversity (as an expression of evolution).
Environment	As defined in Environmental Management Act - the complex of natural and anthropogenic factors and elements that are mutually interrelated and affect the ecological equilibrium and the quality of life, including – (a) the natural environment that is land, water, and air; all organic and inorganic matter and living organisms and (b) the human environment that is the landscape and natural, cultural, historical, aesthetic, economic and social heritage and values.
Environmental Management Plan (Draft EMP)	As defined in the EIA Regulations (Section 8(j)), a plan that describes how activities that may have significant environments effects are to be mitigated, controlled, and monitored.
Interested and Affected Party (I&AP)	In relation to the assessment of a listed activity includes - (a) any person, group of persons or organization interested in or affected by an activity; and (b) any organ of state that may have jurisdiction over any aspect of the activity. Mitigate - practical measures to reduce adverse impacts. Proponent – as defined in the Environmental Management Act, a person who proposes to undertake a listed activity. Significant impact - means an impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment

Term	Definition
Fauna and Flora	The animals and plants found in an area.
Mining Claim	<p>According to the Minerals (Prospecting and Mining) Act No. 13 of 1992), a claim registered under section 36 and includes the renewal of the registration of any such claim;</p> <p>Mining claims are granted to Namibian citizens or to companies owned by Namibian citizens. However, a mining claim holder may choose to contract a foreigner or a company owned by foreigners to prospect and mine. An individual or a company can only be awarded a maximum of ten (10) mining claims at a time. The registration of a mining claim is subject to an Environmental Clearance Certificate, issued by MEFT (MME, 2010).</p> <p>Available only to Namibian citizens for the development of small-scale mining. Mining claims are valid for 3 years and 2-year extension periods are possible provided that the claim is being developed or worked.</p>
Mitigation	The purposeful implementation of decisions or activities that are designed to reduce the undesirable impacts of a proposed action on the affected environment
Monitoring	Activity involving repeated observation, according to a pre-determined schedule, of one or more elements of the environment to detect their characteristics (status and trends).
Proponent	Organization (private or public sector) or individual intending to implement a development proposal.
Public Consultation/Involvement	A range of techniques that can be used to inform, consult or interact with stakeholders affected by the proposed activities.
Protected Area	Refers to a protected area that is proclaimed in the Government Gazette according to the Nature Conservation Ordinance number 4 of 1975, as amended.
Scoping	<p>An early and open activity to identify the impacts that are most likely to be significant and require specialized investigation during the EIA work. Can, also be used to identify alternative project designs/sites to be assessed, obtain local knowledge of site and surroundings, and prepare a plan for public involvement.</p> <p>The results of scoping are frequently used to prepare a Terms of Reference for the specialized input into full EIA.</p>

1 INTRODUCTION

1.1 Project Background and Location

Ndawanenwa Mineral Exploration CC (hereinafter referred to as the Proponent) has applied to the Ministry of Mines and Energy (MME) on the 27th of February 2023 to be granted the rights explore and at a small-scale, mine Industrial Minerals (lithium) on eight (8) Mining Claims (MCs) No. 74188, 74189, 74190, 74191, 74192, 74193, 74194 and 74195 (hereinafter collectively referred to as MC74188 – 74195).

The MCs are located on Farm Daheim No. 106, about 15km north of Karibib in the Erongo Region (as shown on the maps in Figure 1-1 and Figure 1-2). The eight MCs cover a combined area of 118.225 hectares (Ha).

For MME to consider the granting of the exploration and mining rights on the MCs, the Proponent is required to obtain an Environmental Clearance Certificate (ECC) and submit to the MME.

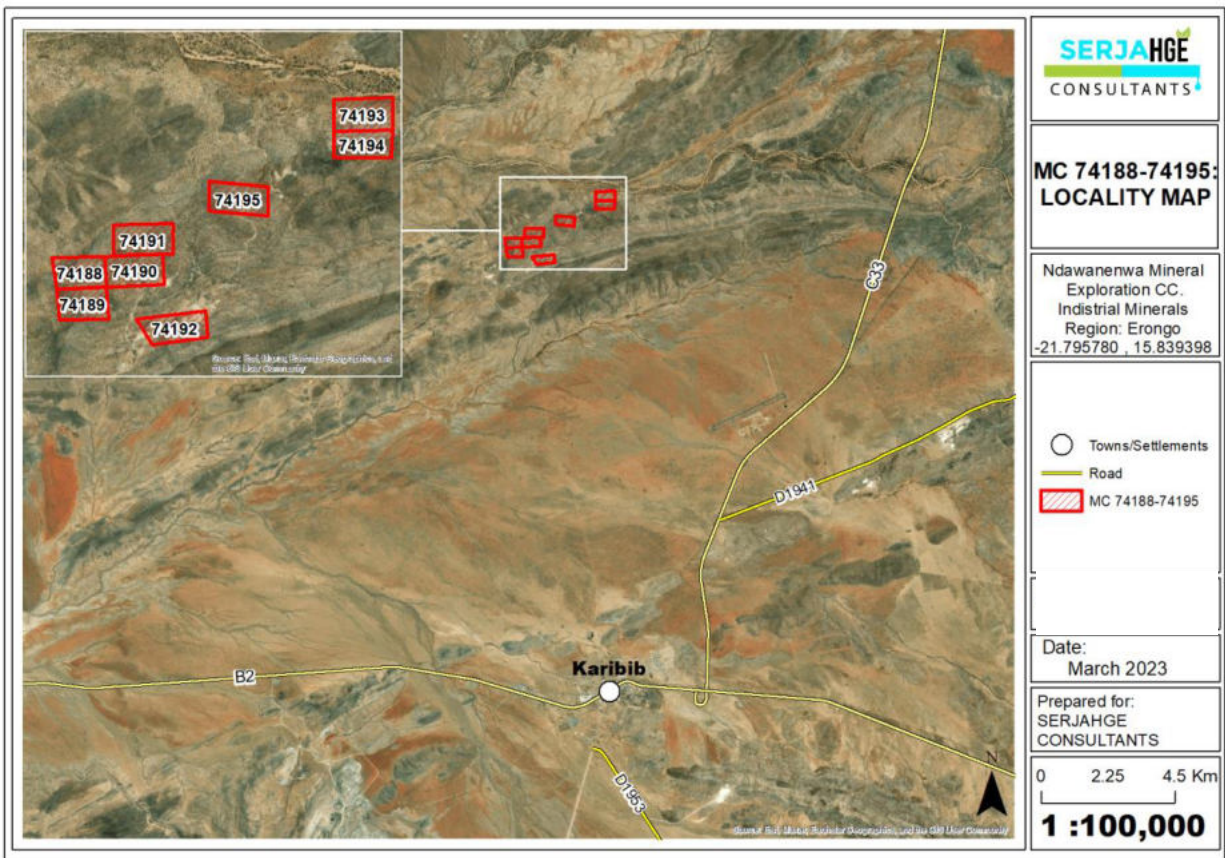


Figure 1-1: Locality map of the eight Mining Claims (MCs). No. 74188 – 74195) north of Karibib

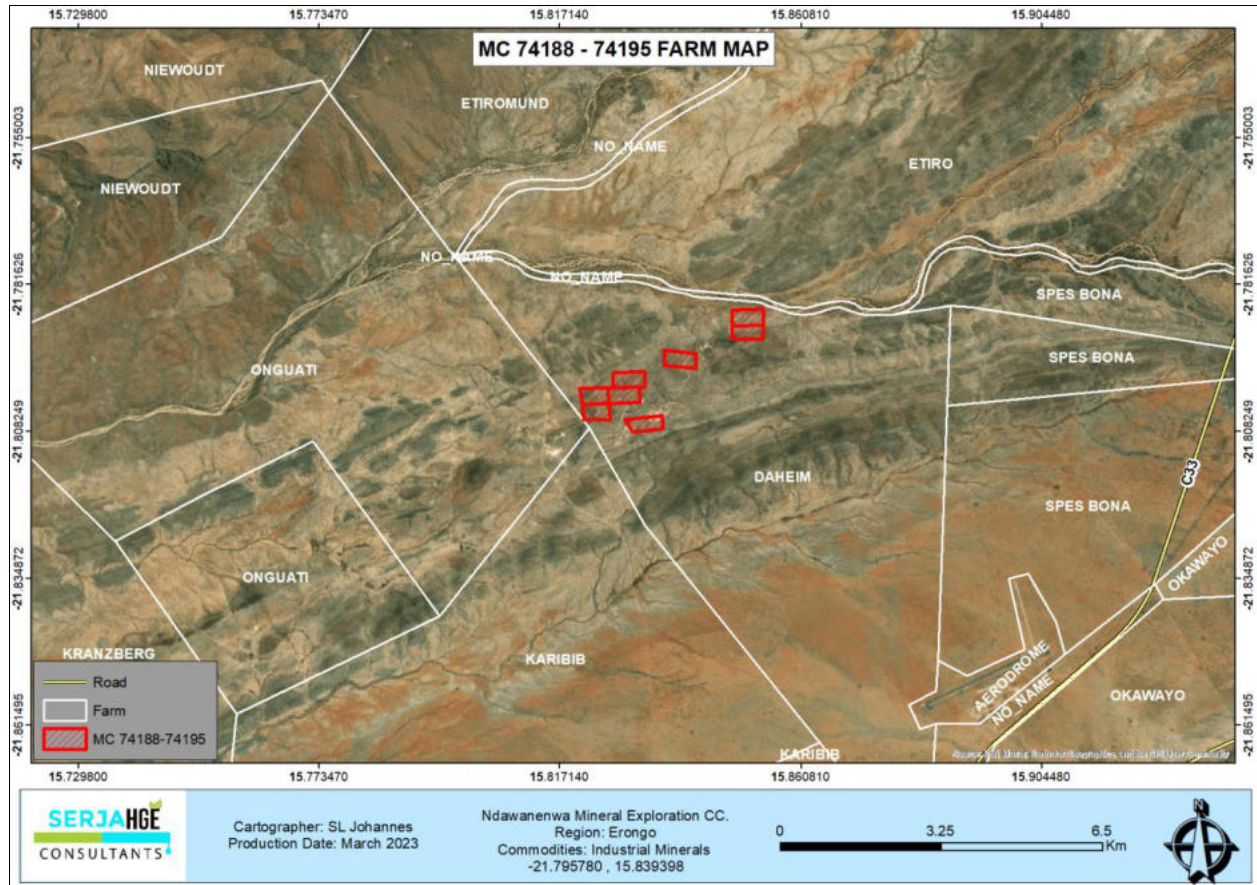


Figure 1-2: Locality map of the MCs inside Farm Daheim No. 106

1.2 The Need and Desirability of the Proposed Project

Mining contributes about 12.5% towards Namibia's Gross Domestic Product (GDP). The mining industry is one of the largest contributors to the Namibian economy; therefore, it contributes to the improvement of livelihoods. In Namibia, exploration for minerals is done mainly by the private sector.

The industrial mineral (lithium) targeted on the mining claims is one of most sought after commodities worldwide, as its uses in economies have become crucial. The current common use for lithium is its driving force behind the new consumer electronic battery technologies and electric cars. According to Xinhai Mineral Processing¹ as a light metal, lithium is widely used in industrial production because of its great toughness, good ductility and good chemical activity. At present, the types of lithium ore used in the industrial field are spodumene, lithium phosphate, iron lithium micite and lithium permeable feldase, etc.

¹ Xinhai Mineral Processing. (2014). https://www.xinhaimineral.com/en/special_reports/lithium-mine/?utm_source=google&utm_medium=cpc&utm_network=g&utm_device=c&utm_criteria=Broad&utm_adposition=&utm_term=process%20of%20lithium%20mining&utm_content=lithium_mining_process&utm_campaign=mining_africa_EX&utm_acc=xzh&gad=1&gclid=CjwKCAjvwJyBhApEiwAWz2nLTGZN2PWPZWSFm7KuLTzm536SrsT-2vdewGT9GAmF5lvNWJkgEiNkxoCE8UQAvD_BwE

²Due to its high reactivity, pure elemental lithium is not found in nature but is instead present as a constituent of salts or other compounds

Therefore, the successful exploration and mining of lithium on the MCs would contribute towards achieving the goals of the national development plans through GDP and contribute to the global industrial use.

1.3 The Need for an ESA and Environmental Clearance Certificate (ECC)

Prospecting, exploration of and mining of mineral resources are some of the listed activities in the Environmental Impact Assessment (EIA) Regulations (2012) of the Environmental Management Act (EMA) No. 7 of 2007 that may not be undertaken without an Environmental Clearance Certificate (ECC). The activities that are relevant to proposed project activities are as follows:

- *3.1 The construction of facilities for any process or activities which require a license, right of other forms of authorization, and the renewal of a license, right or other form of authorization, in terms of the Minerals (Prospecting and Mining Act, 1992).*
- *3.2 other forms of mining or extraction of any natural resources whether regulated by law or not.*
- *3.3 Resource extraction, manipulation, conservation, and related activities.*

The purpose of the ESA Study and subsequent issuance of the ECC is therefore to ensure that the proposed project activities are undertaken in an environmentally & socially friendly and sustainably manner, through the effective implementations of recommended environmental management measures to minimize the adverse identified impacts while maximizing the positive impacts.

1.4 Appointed Independent Environmental Consultant

To comply with the EMA and its Regulations and ensure environmental management, protection, and sustainability, Ndawanenwa Mineral Exploration appointed Serja Hydrogeo-Environmental Consultants CC, Independent Environmental Consultants to apply for the ECC and conduct the required Environmental Assessment Process, which includes Public Consultation and prepare the Environmental Assessment Report and Management Plan (EMP).

The ESA process, including public consultation and engagement as well as compilation of the associated documents were conducted and compiled by Ms. Fredrika Shagama. Ms. Shagama is a qualified and experienced Hydrogeologist and Environmental Assessment Practitioner (EAP) by training and experienced with over 7 years' experience in Groundwater and Environmental Management Consulting. Her CV is attached to this Report as Appendix A.

² Understanding the Basics of Lithium Extraction - A Publication of SAMCO Technologies.
<https://f.hubspotusercontent20.net/hubfs/2531874/Understanding%20the%20Basics%20of%20Lithium%20Extraction.pdf>

1.5 Application for the Environmental Clearance Certificate

The application for the ECC process was done as follows:

- Prepare of prepared Background Information Document (BID) for the proposed project,
- Launching of the ECC application on the ECC Portal of the Ministry of Environment, Forestry and Tourism (MEFT) with the Proponent details (accompanied by the BID) for project registration purposes and obtaining a MEFT application / reference number (APP-01423),
- Completion of the Form 1 (Section 32) of the EIA Regulations with the required project and Proponent information and submission of the Form to the Office of the Environmental Commissioner.

The next component of the ECC application was to undertake an Environmental Scoping Assessment (ESA) process, which entails Baseline Assessment of the Biophysical and Social environments as well as Public Consultation & Engagement. The findings of the ESA process are then incorporated into an ESA Report and a Draft EMP is also developed for the mitigation of potential adverse impacts anticipated from the proposed project activities. The two documents and associated documents (appendices) are then submitted to the Environmental Commissioner at MEFT's Department of Environmental Affairs and Forestry (DEAF) for evaluation and consideration of the ECC.

1.6 Scope of Work and Report Contents

This Study has been conducted according to the EMA No. 7 of 2007, and its 2012 EIA Regulations as mentioned in the preceding subsections, i.e., the proposed project may not be undertaken without an ECC. Therefore, the process has been undertaken as required and guided by the Regulations. Furthermore, the ECC is required by the MME for consideration to issue the exploration and mining rights.

This Report has been compiled as a required output of an environmental assessment process after the ECC application has been submitted to the Competent Authority (MME). The ESA Report, together with the EMP and all its appendices will be submitted to the DEAF.

The document (Report) covers the following chapters or sections, in addition to the introductory chapter:

- Project description and associated activities - (Chapter 2).
- Project alternatives considered (that were found to be environmentally friendly and technically feasible) - Chapter 3).
- The Legal requirements governing the proposed project and its related activities, i.e., the legislations that the proposed project must comply with (Chapter 4).
- The Environmental and Social Baseline of the project area - Chapter 5.
- The Public Consultation & Engagement Process undertaken to inform, invite and engage the public (stakeholders and interested & affected parties) on the proposed project- Chapter 6.

- The Assessment of identified potential impacts associated with the proposed project (Chapter 7) - This chapter presents both the positive and negative (adverse) as well as cumulative impacts, assessment methodology and the assessment of the negative impacts. The mitigation measures in the form of management action plans, with timeframe and implementation responsibilities are given in Draft Environmental Management Plan (EMP) under Appendix B.
- The recommendations and conclusions to the environmental assessment are presented under Chapter 8. The data sources (literature/references) consulted for the assessment are listed under Chapter 9.

Based on the information provided by the Proponent and the EAP's experience, description of the project activities is presented under the next chapter.

2 DESCRIPTION OF THE PROPOSED PROJECT ACTIVITIES

Prior to mobilizing to site and undertaking any groundwork for the proposed activities at the site, the Proponent will be required to sign land access and use agreements with the affected landowner (farmer) according to Section 52 (1) (a) of the Minerals (Prospecting and Mining) Act No. 33 of 1992.

2.1 Proposed Exploration Activities

The prospecting and exploration approach for the commodity will be carried out as per the following methods and presented under the subsections below.

- Geological mapping (Non-invasive technique): The exploration program will commence with a review of geological maps and historical drilling and / or exploration data for the area, if any. Geophysical surveys form part of this technique, which will entail data collection of the substrata. Ground geophysical surveys are also conducted, where necessary using vehicle-mounted sensors.
- Lithological sampling programmes (invasive technique): these activities may last from between one week to a month at a time over specific areas, until the explored area is fully sampled as desired. This will entail rock and soil sampling consists of small pits/trenches. Some depiction of rock (minerals) onsite from past mining activities on Farm Daheim is shown in Figure 2-1.



Figure 2-1: Lithium mineral (spodumene) and rock boulders from site with evidence of historical mining on Farm Daheim

- Drilling programmes (invasive technique): Should analyses of soil/rock samples by an analytical laboratory be positive, holes are drilled, and drill samples collected for further analysis. This programme may initially range from two weeks to a month at a time, depending on the planned programme or based on the results of the programme. The Proponent undertakes to work with all relevant stakeholders to keep them informed of exploration progress to facilitate site visits and access to ongoing field exploration programmes.

The anticipated drilling method will be Reverse Circulation (RC) and diamond-core drilling RC drilling uses a pneumatic hammer, which drives a rotating tungsten-steel bit. The technique produces an uncontaminated large volume sample, which is comprised of rock chips. It is relatively quicker and cheaper when compared to other techniques like Diamond Drilling. However, diamond drilling may also be considered for this exploration programme, for better geological control and to perform processing trials.

A typical drilling site will consist of a drill-rig and support vehicles as well as a drill core and geological samples store. A drill equipment parking and maintenance yard may be set up (including a fuel and lubricants storage facility).

2.2 Mining of Industrial Minerals (Lithium)

There are currently two main ways of acquiring lithium: ore mining and brine extraction. The former follows traditional mining processes, requiring geological surveys and exploration prior to using heavy machinery to remove soil and find lithium-rich deposits within hard rock³.

The extraction (mining) of industrial minerals (lithium) and all associated mining activities on the eight MCs will employ the traditional mining method of ore mining. Both invasive and non-invasive activities as in the exploration stage will be implemented to recover the industrial mineral (lithium) ore. Invasive activities will involve trenching/pitting and drilling for an open pit mining.

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

There are several ways of lithium processing (extraction) from ore. These include adsorption, ion exchange, electro dialysis, precipitation, and others.

It should be noted that there will be no ore processing onsite. Therefore, processing is not provided for in this EIA Report nor its EMP.

2.3 Project Resources and Services Infrastructure

The following services and infrastructure as provided below will be required for the project activities.

2.3.1 Human resources

The exploration crew will consist of a minimum of 7 people, comprising 1 skilled, 2 semi-skilled, 4 casual workers, while mining is expected to employ about twenty (20) people or more. However, this number may vary depending on the stages of the activities onsite.

The workforce requirement will entail the need for geologist(s), drilling personnel, sampling team, supervisor / exploration and mining manager, casual workers to clear the sites and perform other required jobs onsite, cleaner(s), machine operator, truck & light vehicle drivers, etc.

2.3.2 Project Crew Accommodation

The workers will be housed in Karibib and not onsite, i.e., the workers will be commuting from Karibib. Therefore, no onsite accommodation will be required.

³ Egan, T. (2023). The Problem with Current Lithium Extraction Methods. Available from <https://energyx.com/blog/the-problem-with-current-lithium-extraction-methods/>

Project equipment and vehicles as needed will be stored at a designated area near the accommodation site (campsite), or a storage site established within the MCs' site area.

2.3.3 Water Supply

The required water will be used for actual exploration and mining activities such as cooling down and washing of drilling equipment, as well as domestic use (ablution, drinking and cooking). About 10,000 litres of water will be required per day during both exploration and mining stages.

There is one existing borehole onsite that is no longer in use. The Proponent is considering the rehabilitation of this borehole to supply water for the project activities.

If the need arise in the future to drill an extra borehole, the Proponent will obtain permission from the farmer and MAWLR to drill a new water borehole particularly on MC74193 and MC74194 where there are good indication of groundwater potential. For activities on the other 6 MCs, water can be carted from a borehole from the two MCs to avoid the abstraction of groundwater from low groundwater potential area and around MCs. No. 74188, 74189, 74190, 74191, 74192 and 74195 that overlie rock bodies with little groundwater potential.

2.3.4 Fuel supply (For Cooking)

The Proponent will provide firewood or fuel to be used for food preparation by the site workers. No firewood will be collected onsite neither neighbouring land/farms

2.3.5 Fuel Supply (Machinery and Equipment)

Diesel will be used for machinery and equipment and fuel generator. A trailer mounted and banded fuel tank will be used during exploration. For mining, the fuel tank will be installed onsite to ensure an uninterrupted fuel supply to the project.

2.3.6 Accessibility (roads)

The Mining Claims can be accessed from the C33 via farm access roads. If there are no existing tracks, a new access track will be created for the project related vehicles.

2.3.7 Waste management

The onsite waste types will be managed as follows:

- Sewage: Two to three portable ablution facilities with septic tanks will be provided on site and emptied according to manufacturers' instructions.
- General and domestic waste: Solid waste bins (containers) will be made available at the working sites and campsite for waste storage.

- Hazardous waste: All vehicles, machinery and fuel consuming equipment will be provided with drip trays to capture potential fuel spills and waste oils. The waste fuel/oils will be carefully stored in a standardized container to be disposed of at an approved hazardous waste management facility in the country, such as in Windhoek.

2.3.8 Health and Safety

The following measures will be implemented onsite to ensure safety and security:

- Adequate and appropriate Personal Protective Equipment (PPE) will be provided to every project personnel and visitor/inspector while on and working at site and visiting the site, respectively.
- First aid: A minimum of two first aid kits will be readily available at the working sites and site offices to attend to potential minor injuries, while major injuries will need to be attended to further by transporting the injured to the nearest health centre for treatment. At least three personnel will be trained on administer first aid.
- Potential Accidental Fire Outbreaks: As a control measure for accidental fire outbreaks, a basic firefighting equipment, i.e., a fire extinguisher will be readily available in vehicles, at the working sites and temporary site offices. At least 3 site personnel will be trained on and provided with firefighting skills.
- Open trenches and boreholes: The trenches dug for sampling will be temporary fenced off to prevent potential injuries of both people and livestock and wildlife on the farms. Once sampling is completed, the trenches will be progressively backfilled and levelled and fencing removed for storage or donation to the landowner. Similarly, for exploration and mining holes that are no longer required after rock samples, they will be backfilled and closed off as shown on Figure 2-2.

Warning signage at hazardous site areas such as open trenches will be erected.



Figure 2-2: Fenced off exploration trenches awaiting backfilling upon completion of sampling (photos recently taken by Author at an active EPL visited by the Author near Okombahe, Erongo Region

2.4 Decommissioning and Rehabilitation of Disturbed Sites

Once the project activities onsite are completed, the Proponent will need to rehabilitate the disturbed areas as far as practicable. Decommissioning and rehabilitation are primarily reinforced through a decommissioning and rehabilitation plan, which consists of safety, health, environmental, and contingency aspects. The best practice for the Proponent to ensure the project activities are ceased in an environmentally friendly manner and site is rehabilitated by carrying out the following:

- Dismantling and removal of associated infrastructures from the project site,
- Carrying away all exploration and mining equipment and vehicles, and
- Clean up of site working areas and transporting the recently generated waste to the nearby approved waste management facility (as per agreement with the facility operator/owner).

Further decommissioning and rehabilitation practice onsite will include:

- Backfilling of pits and trenches used for sampling,
- Closing and capping of holes to ensure that they do not pose a risk to both people and animals in the area, and
- Levelling of stockpiled topsoil. This will be done to ensure that the disturbed land sites are left close to their original state as much as possible.

2.5 Post-Exploration and Mining Activities

After a successful exploration activity, the EPL would be converted into a Mining License by submitting exploration results and an application to the MME to convert the EPL into a Mining License. Upon pre-approval of the application by MME, feasibility study and full EIA Study (with an approved ECC for mining activities), the approved area would be prepared for mine development and actual mining and subsequent mine closure.

The next chapter is the presentation different and relevant alternatives considered for the project activities.

3 PROJECT ALTERNATIVES

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

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

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

The alternatives considered for the proposed project are discussed below.

3.1 The "No-Go" Alternative

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

This option was considered and a comparative assessment of the environmental and socio-economic impacts of the “no action” alternative was undertaken to establish what benefits might be lost if the project is not implemented.

Considering the above losses, the “no-action/go” alternative was not considered a viable option for this project.

3.2 Location: Exploration and Mining

The locality of exploration activities and subsequent mining are dependent on the geological setting (regional and local), the economic geology, as well as preference of the mining claims applicant in specific commodities. The mineralization of the target commodities is area-specific, which means the project targets are primarily determined by the geology (host rocks) and the ore-forming mechanism.

Furthermore, the national mineral resources' potential locations are also mapped and categorized by the Ministry of Mines and Energy in exclusive prospecting licenses, mining licenses and claims, mineral deposit retention licenses, reconnaissance licenses and exclusive reconnaissance licenses. Available information on the 8 MCs and other licenses are available on the Namibia Mining Cadastral Map here <https://maps.landfolio.com/Namibia/>.

3.3 Exploration Methods

Both invasive and non-invasive exploration activities as indicated under the project description chapter are expected to take place. These were found to be appropriate and reliable for the type of commodities explored for. If any other alternative viable exploration methods are found to achieve the purpose more effectively and/or efficiently without aggravating any environmental measures put in place, it can be implemented.

3.4 Services Infrastructure

Alternatives were considered for the different supporting infrastructures envisaged to ensure that the most feasible options were selected. The technological, economic, and environmental limitations were considered to select the most feasible option. The alternative considered in this regard are presented in Table 3-1 below.

Table 3-1: The presentation of service infrastructure alternatives considered for the project activities

Category of Infrastructure	Alternatives Considered	Justification for selected option
Ablution facilities	-Install fixed facility with septic tank -Portable facilities with septic tank	-To minimize rehabilitation costs portable facilities were selected as the best option
Water supply	-Bring water from elsewhere -Abstract from site boreholes	-The Proponent will consider drilling a borehole on the Farm, specifically the Proponent will obtain permission from the farmer and apply for a permit (from MAWLR) to drill a new water supply boreholes particularly on MC74193 and MC74194 where there are good indication of groundwater potential. -Should the option of drilling a new water borehole come out as costly or the borehole cannot supply enough water, then water will be brought from elsewhere to minimize the impact on the local resources.
Fuel storage	-Trailer mounted diesel tank -Fixed bunded fuel tank	-During exploration use trailer mounted diesel tank for fuel storage due to great mobility requirements during exploration. During mining, the fuel tank will be installed onsite.
Power supply	-Diesel generator set and if considered, solar power. -Powerline (grid) supply	-The diesel and or solar power are the most practical & economically viable options for exploration, and eventually mining. However, connection to the nearest power grid can be considered.
Office structures	-Erect dis-mantable prefabricated units -Fixed structures	-Dismantable prefabricated unites are favoured due to: (a) Ease of installation, (b) Low installation costs and (c) Ease of dismantling & moving.
Accommodation site	-Setting up campsites tented campsite on Farm Daheim within the MCs' area or	-Commuting from Karibib is preferred to avoid having a group of workers residing

Category of Infrastructure	Alternatives Considered	Justification for selected option
	temporary availed facilities by the farm owner(s) -Commuting from Karibib	onsite which would exert pressure on the farm services such as water, and electricity/power use.

The following chapter presents the national and international legal requirements that are applicable and relevant to project.

4 APPLICABLE LEGAL FRAMEWORK

The project's activities or some of them may be regulated and governed by certain legal or policies. Therefore, it is necessary to review and consider these legislations and legal requirements. These legal requirements are either on a local (institutional), national (Namibian) and international legislation, policies, guidelines, etc. This review serves to inform the project Proponent, Interested and Affected Parties, and the decision-makers at the DEAF of the requirements and expectations, as laid out in terms of these instruments, to be fulfilled to establish the proposed project activities.

4.1 Environmental Management Act No. 7 of 2007

The Environmental Management Act No.7 of 2007 and its 2012 EIA Regulations aims to ensure that the potential impacts of the development on the environment are considered carefully and in good time; that all interested and affected parties have a chance to participate in the environmental assessments and that the findings of the environmental assessments are fully considered before any decisions are made about activities which might affect the environment.

The Act aims at promoting sustainable management of the environment and use of natural resources. The Environmental Management Act (EMA) is broad; it regulates land use development through environmental clearance certification and/or Environmental Impact Assessments. The Act provides for the clearance certification for "*mining and quarrying activities*".

4.2 Minerals (Mining & Prospecting) Act No. 33 of 1992

The most applicable Sections to the project are as follows:

- Section 52 (1) (a) requires mineral license holders to enter into a written agreement with affected landowners before exercising rights conferred upon the license holder.
- Section 54 requires written notice to be submitted to the Mining Commissioner if the holder of a mineral license intends to abandon the mineral license area.
- Section 68 stipulates that an application for a mineral license shall contain the particulars of the condition of, and any existing damage to, the environment in the area to which the application relates and an estimate of the effect which the proposed operations may have on the environment and the proposed steps to be taken to prevent or minimize any such effect.
- Section 91 requires that rehabilitation measures should be included in an application for a mineral license.

Implication for the proposed project: The Proponent should carry out an assessment of the impact on the receiving environment. The Proponent should include as part of their application for the MCs, measures by which they will rehabilitate the areas where they intend to carry out exploration activities.

Other applicable legal framework and policies relevant to the proposed project are presented in Table 4-1.

Table 4-1: List of applicable legislation for the proposed exploration and mining activities on the EPL

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

Legislation / Policy / Guideline	Relevant Provisions	Implications for the project activities
Nature Conservation Amendment Act, No. 3 of 2017	National Parks are established and gazetted in accordance with the Nature Conservation Ordinance, 1975 (4 of 1975), as amended. The Ordinance provides a legal framework with regards to the permission of entering a state protected area, as well as requirements for individuals damaging objects (geological, ethnological, archaeological, and historical) within a protected area. Though the Ordinance does not specifically refer to mining as an activity within a protected area (PA) or recreational area (RA), it does restrict access to PA's and prohibits certain acts therein as well as the purposes for which permission to enter game parks and nature reserves may be granted.	The Proponent will be required to enhance the conservation of biodiversity and the maintenance of the ecological integrity of protected areas and other State land
The Parks and Wildlife Management Bill of 2008	Aims to provide a regulatory framework for the protection, conservation, and rehabilitation of species and ecosystems, the sustainable use and sustainable management of indigenous biological resources, and the management of protected areas, to conserve biodiversity and to contribute to national development.	
Minerals (Prospecting and Mining) Act (No. 33 of 1992)	<p>Section 52(1) (a) requires mineral license holders to enter into a written agreement with affected landowners before exercising rights conferred upon the license holder.</p> <p>Section 54 requires written notice to be submitted to the Mining Commissioner if the holder of a mineral license intends to abandon the mineral license area.</p> <p>Section 68 stipulates that an application for any mineral license shall contain the particulars of the condition of, and any existing damage to, the environment in the area to which the application relates and an estimate of the effect which the proposed operations may have on the environment and the proposed steps to be taken to prevent or minimize any such effect.</p> <p>Section 91 requires that rehabilitation measures should be included in an application for a mineral license.</p>	<p>The Proponent should enter into a written agreement with landowners before carrying out activities on their land.</p> <p>The Proponent should carry out an assessment of the impact on the receiving environment.</p> <p>The Proponent should include as part of their application for the MCs, measures by which they will rehabilitate the areas where they intend to carry out mineral exploration and mining activities.</p> <p>The Proponent may not carry out activities within the areas limited by Section 52 (1) of this Act.</p>
Mine Health & Safety Regulations, 10 th Draft	Makes provision for the health and safety of persons employed or otherwise present in mineral licenses area. These deal with among other matters; clothing and devices; design, use, operation, supervision, and control of machinery; fencing and guards; and safety measures during repairs and maintenance.	The Proponent should comply with all these regulations with respect to their employees.

Legislation / Policy / Guideline	Relevant Provisions	Implications for the project activities
Petroleum Products and Energy Act (No. 13 of 1990) Regulations (2001)	Regulation 3(2)(b) states that "No person shall possess [sic] or store any fuel except under authority of a licence or a certificate, excluding a person who possesses or stores such fuel in a quantity of 600 litres or less in any container kept at a place outside a local authority area"	The Proponent should obtain the necessary authorisation from the MME for the storage of fuel on-site. This authorisation is known as the consumer installation certificate.
The Regional Councils Act (No. 22 of 1992)	This Act sets out the conditions under which Regional Councils must be elected and administer each delineated region. From a land use and project planning point of view, their duties include, as described in section 28 "to undertake the planning of the development of the region for which it has been established with a view to physical, social and economic characteristics, urbanisation patterns, natural resources, economic development potential, infrastructure, land utilisation pattern and sensitivity of the natural environment.	The relevant Regional Councils are I&APs and must be consulted during the Environmental Assessment (EA) process. The project site falls under the Erongo Regional Council; therefore, they should be consulted throughout the project implementation.
Water Act 54 of 1956	<p>The Water Resources Management Act 11 of 2013 is presently without regulations; therefore, the Water Act No 54 of 1956 is still in force:</p> <p>Prohibits the pollution of water and implements the principle that a person disposing of effluent or waste has a duty of care to prevent pollution (S3 (k)).</p> <p>Provides for control and protection of groundwater (S66 (1), (d (ii)).</p> <p>Liability of clean-up costs after closure/abandonment of an activity (S3 (l)). (l)).</p>	<p>The protection (both quality and quantity/abstraction) of water resources should be a priority.</p> <p>Relevant permits and or agreements to drill a water borehole, abstract and use water should be applied for and obtained from MAWLR's Water Affairs Department.</p>
Water Resources Management Act (No 11 of 2013)	<p>The Act provides for the management, protection, development, use and conservation of water resources; and provides for the regulation and monitoring of water services and to provide for incidental matters. The objects of this Act are to:</p> <p>Ensure that the water resources of Namibia are managed, developed, used, conserved and protected in a manner consistent with, or conducive to, the fundamental principles set out in Section 66 - protection of aquifers, Subsection 1 (d) (iii) provide for preventing the contamination of the aquifer and water pollution control (Section 68).</p>	

Legislation / Policy / Guideline	Relevant Provisions	Implications for the project activities
National Heritage Act No. 27 of 2004	To provide for the protection and conservation of places and objects of heritage significance and the registration of such places and objects; to establish a National Heritage Council; to establish a National Heritage Register; and to provide for incidental matters.	The Proponent should ensure compliance with these Acts requirements. The necessary management measures and related permitting requirements must be taken. This done by the consulting with the National Heritage Council of Namibia. A Chance Finds Procedure provided to the Draft EMP should be implemented upon discovery of archaeological and heritage resources.
The National Monuments Act (No. 28 of 1969)	The Act enables the proclamation of national monuments and protects archaeological sites.	
Soil Conservation Act (No 76 of 1969)	The Act makes provision for the prevention and control of soil erosion and the protection, improvement and conservation of soil, vegetation and water supply sources and resources, through directives declared by the Minister.	Duty of care must be applied to soil conservation and management measures must be included in the EMP.
Forestry Act (Act No. 12 of 2001	The Act provides for the management and use of forests and forest products. Section 22. (1) provides: "Unless otherwise authorised by this Act, or by a licence issued under subsection (3), no person shall on any land which is not part of a surveyed erven of a local authority area as defined in section 1 of the Local Authorities Act, 1992 (Act No. 23 of 1992) cut, destroy or remove - (a) vegetation which is on a sand dune or drifting sand or on a gully unless the cutting, destruction or removal is done for the purpose of stabilising the sand or gully; or (b) any living tree, bush or shrub growing within 100 m of a river, stream or watercourse."	The proponent will apply for the relevant permit under this Act if it becomes necessary.
Public Health Act (No. 36 of 1919)	Section 119 states that "no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health."	The Proponent and all its employees should ensure compliance with the provisions of these legal instruments.
Public and Environmental Health Act No. 1 of 2015	The Act serves to protect the public from nuisance and states that no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health.	

Legislation / Policy / Guideline	Relevant Provisions	Implications for the project activities
Health and Safety Regulations GN 156/1997 (GG 1617)	Details various requirements regarding health and safety of labourers.	
Atmospheric Pollution Prevention Ordinance (1976)	This ordinance provides for the prevention of air pollution and is affected by the Health Act 21 of 1988. Under this ordinance, the entire area of Namibia, apart from East Caprivi, is proclaimed as a controlled area for the purposes of section 4(1) (a) of the ordinance.	The proposed project and related activities should be undertaken in such a way that they do not pollute or compromise the surrounding air quality. Mitigation measures should be put in place and implemented.
Hazardous Substance Ordinance, No. 14 of 1974	The ordinance provides for the control of toxic substances. It covers manufacture, sale, use, disposal and dumping as well as import and export. Although the environmental aspects are not explicitly stated, the ordinance provides for the importing, storage, and handling.	The Proponent should handle and manage the storage and use of hazardous substances on site so that they do not harm or compromise the site environment
Road Traffic and Transport Act, No. 22 of 1999	The Act provides for the establishment of the Transportation Commission of Namibia; for the control of traffic on public roads, the licensing of drivers, the registration and licensing of vehicles, the control and regulation of road transport across Namibia's borders; and for matters incidental thereto.	Mitigation measures should be provided for, if the roads and traffic impact cannot be avoided, the relevant permits must be applied for.
Labour Act (No. 6 of 1992)	Ministry of Labour, Industrial Relations and Employment Creation is aimed at ensuring harmonious labour relations through promoting social justice, occupational health and safety and enhanced labour market services for the benefit of all Namibians. This ministry insures effective implementation of the Labour Act No. 6 of 1992.	The Proponent should ensure that the exploration and mining activities do not compromise the safety and welfare of workers.

4.3 International Policies, Principles, Standards, Treaties and Conventions

Given the fact that the proposed project is likely to be funded by international investors and the financing require the project to comply with certain requirements. Therefore, it is crucial to include the relevant legal requirements in this ESA Study and these are listed below:

- Equator Principles (EP):
 - *EP1: Review and Categorization*
 - *EP2: Environmental and Social Assessment*
 - *EP 3: Applicable Environmental and Social Standards*
 - *EP 4: Environmental and Social Management System and Equator Principles Action Plan*

- *EP5: Stakeholder Engagement*
- *EP6: Grievance Mechanism*
- *EP7: Independent Review*
- *EP8: Covenants*
- *EP9: Independent Monitoring and Reporting*
- *EP10: Reporting and Transparency.*
- International Finance Corporation (IFC) Performance Standards (PS):
 - *PS1: Assessment and Management of Environmental and Social Risks and Impacts*
 - *PS2: Labour and Working Conditions*
 - *PS3: Resource Efficient and Pollution Prevention and Management*
 - *PS4: Community Health and Safety*
 - *PS5: Land Acquisition, Restrictions on Land Use, and Involuntary Resettlement*
 - *PS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources*
 - *PS7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities*
 - *PS8: Cultural Heritage*
 - *PS9: Financial Intermediaries (FIs)*
 - *PS10: Stakeholder Engagement and Information*
- The United Nations Convention to Combat Desertification (UNCCD) 1992
- Convention on Biological Diversity 1992
- Stockholm Declaration on the Human Environment, Stockholm (1972)

Other relevant international Treaties and Protocols ratified by the Namibian Government are:

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

In addition to the project description, alternatives, and legal framework, it is also important to note that the proposed project activities will be undertaken in a specific environment, in terms of biophysical and social. Therefore, understanding these existing environmental features before the project activities, is crucial for the assessment of the potential impacts stemming from the project activities on the features.

5 BIOPHYSICAL AND SOCIAL BASELINE

The proposed project activities will be undertaken in specific environmental and social conditions. Therefore, understanding the pre-project conditions of the environment will aid in describing the status quo versus future projections of environmental conditions once the project is implemented. The baseline information also aids in identifying the sensitive environmental features and how best suitable management and mitigation measures can be recommended for implementation. The summary of selected biophysical and social baseline information about the project area is given below.

The baseline information presented below is sourced from site visit, online sources ranging from old reports, books and publishing as well as other relevant research information in the broader area. The project baseline that is deemed necessary to the project activities are as follows.

5.1 Biological Environment

According to Erongo Regional Council (2015), the hyper-arid Namibian coastal ecosystem is home to a significant and unique array of biological and ecological diversity, including uniquely adapted plants and animals, rich estuarine fauna and a high diversity of migratory shore and seabirds. Namibia's coastal zones are considered as refuge for several of endangered species.

5.1.1 Fauna

The Karibib area in general is regarded as “moderate” in overall (all terrestrial species) diversity while the overall terrestrial endemism in the area on the other hand is “high” (Mendelsohn *et al.* 2002). The overall diversity and abundance of large herbivorous mammals (big game) is viewed as “moderate” with 3-4 species expected – e.g. gemsbok, kudu, mountain zebra and springbok – while overall diversity and density of large carnivorous mammals (large predators) is viewed as “moderate” with 4 species expected – e.g. leopard, cheetah, spotted and brown hyena (Mendelsohn *et al.* 2002 as cited by Cunningham, 2022).

In terms of fauna, the Karibib farms are homes to both domestic and wildlife. Livestock farming is practised in some farms, which comprises of goats, sheep, cattle and horses as common livestock.

According to the Daheim Farm owner, there are currently no animals on the Farm.

5.1.2 Flora

The general Karibib area is viewed as an area of importance for local endemic plant species, especially the Erongo Mountains with between 26-35 endemic species (Mendelsohn *et al.* 2002). Cunningham 2022 as cited by Excel Dynamic Solutions (2022), the overall plant diversity (all species) in the general Karibib area is estimated at between 150-299 species and the Erongo Mountain area between 400-499 species (Mendelsohn *et al.* 2002). These estimates are limited to “higher” plants as information regarding “lower”

plants is sparse. The greatest variants affecting the diversity of plants are habitat and climate with the highest plant diversity generally associated with high rainfall areas. Pockets of high diversity are found throughout Namibia in “unique” habitat – often transition zones – e.g. mountains, inselbergs, etc. Plant endemism, other than the Erongo Mountains, is viewed as “medium to high” – with between 6-15 endemics expected from the general area (Mendelsohn *et al.* 2002). Furthermore, Mendelsohn *et al.* (2002) views the overall plant production as medium to low in the general Karibib area and high in the Erongo Mountains, the availability of hardwoods as medium and the grazing and browse as average in the general area

From a local perspective, the MCs are found within the sparse shrubland of the Central Desert vegetation type (Mendelsohn, *et al* 2002) as shown on the map in Figure 5-1

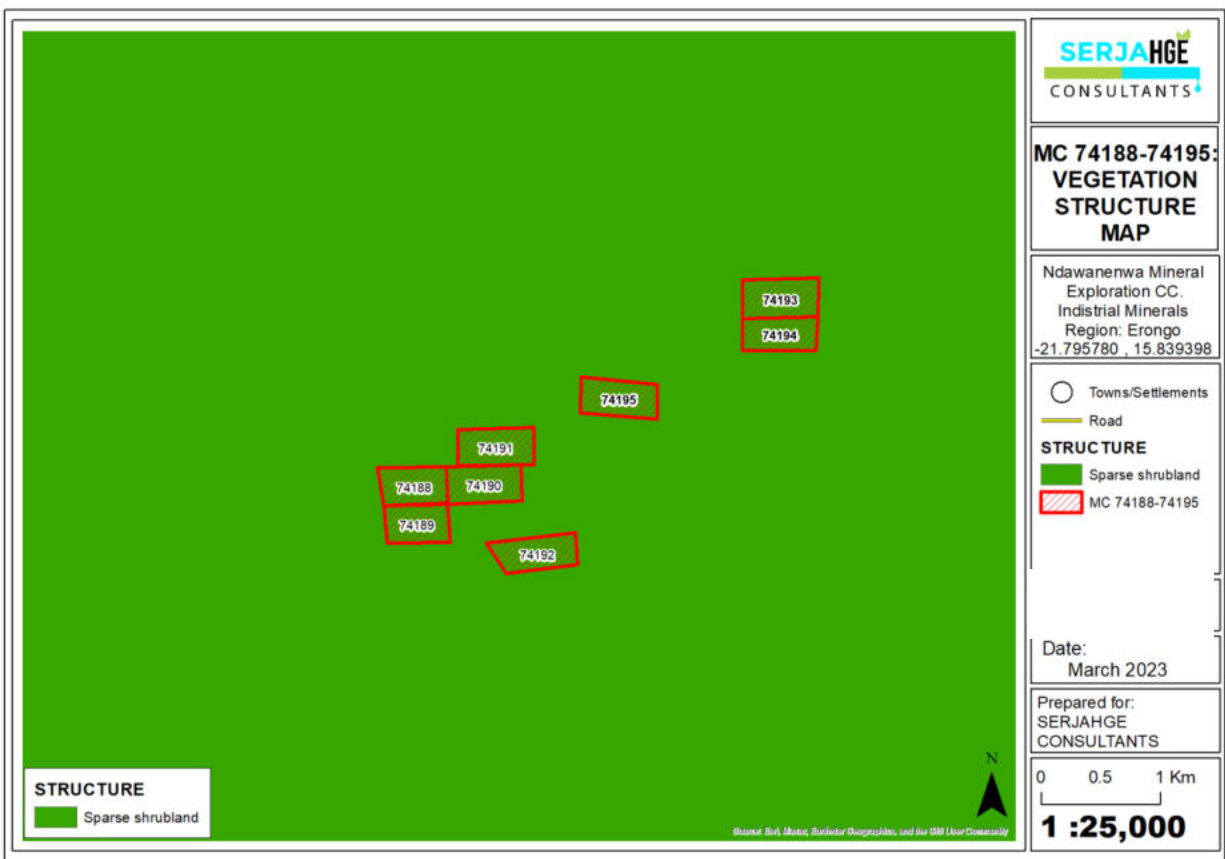


Figure 5-1: Dominant vegetation (dense shrubs) map within and around the MCs

The MCs and Farm at large are covered by medium grass cover, and shrubs and young trees of camelthorn species (*Vachellia reficiens* (red-thorn)) and *Boscia foetida* (smelly or stinky shepherd’s tree) as shown in Figure 5-2.



Figure 5-2: Some of the vegetation observed in the MCs' area (grass cover with *Vachellia reficiens* and *Boscia foetida* shrubs)

5.2 Physical Environment

5.2.1 Climate

The climatic conditions of the site area are described using the available nearest data for Karibib area obtained from Mendelsohn *et al* (2002), World Weather Online and Meteoblue websites (2022).

Temperature: Karibib area experiences average maximum temperatures of 34°C in October and minimum temperature of 10°C in June/July as shown in Figure 5-3.

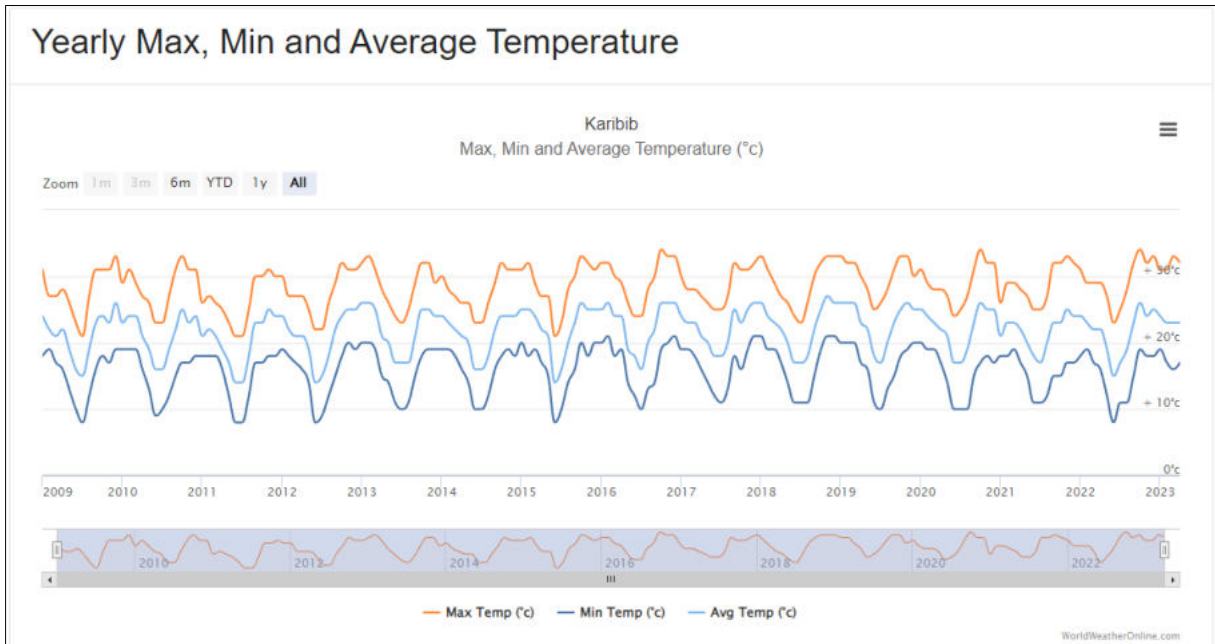


Figure 5-3: The annual maximum, minimum and average temperatures for Karibib area (World Weather Online, 2023)

The average low and high temperatures are 10 and 32°C in June/July and October/November/December, respectively as shown in Figure 5-4.

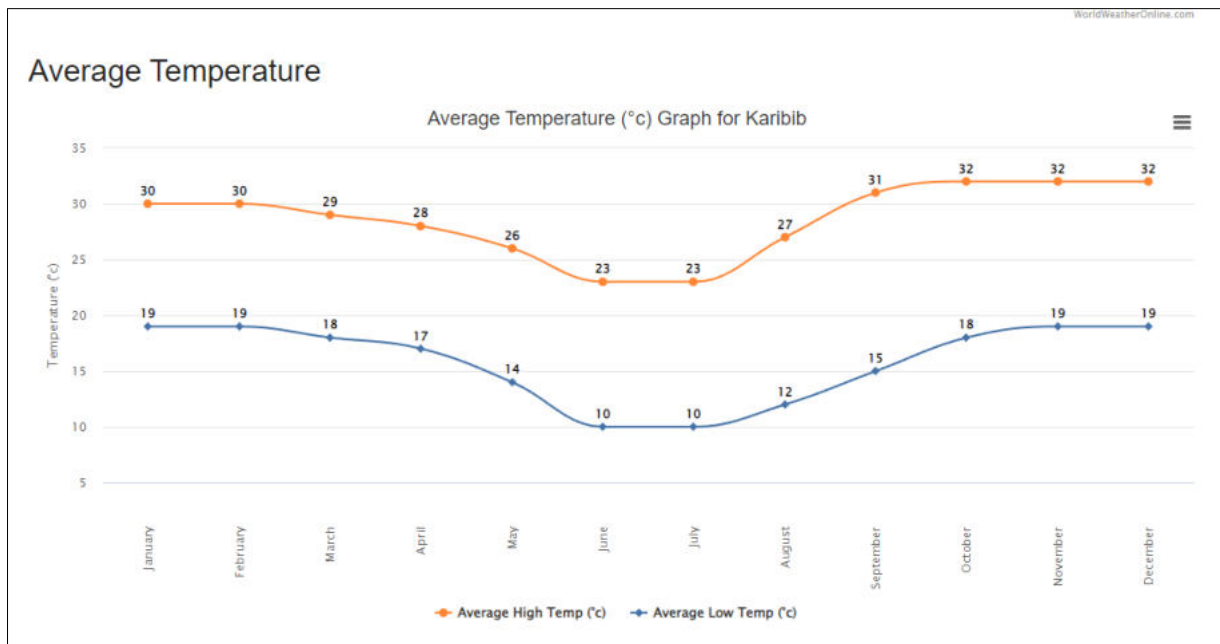


Figure 5-4: The monthly average temperatures for Karibib area (World Weather Online, 2023)

In terms of rainfall, according to the World Weather Online (2023) rainfall records for the last 13 years, the project area received 155mm (in February 2012) and 137mm (February 2009) as shown in Figure 5-4.

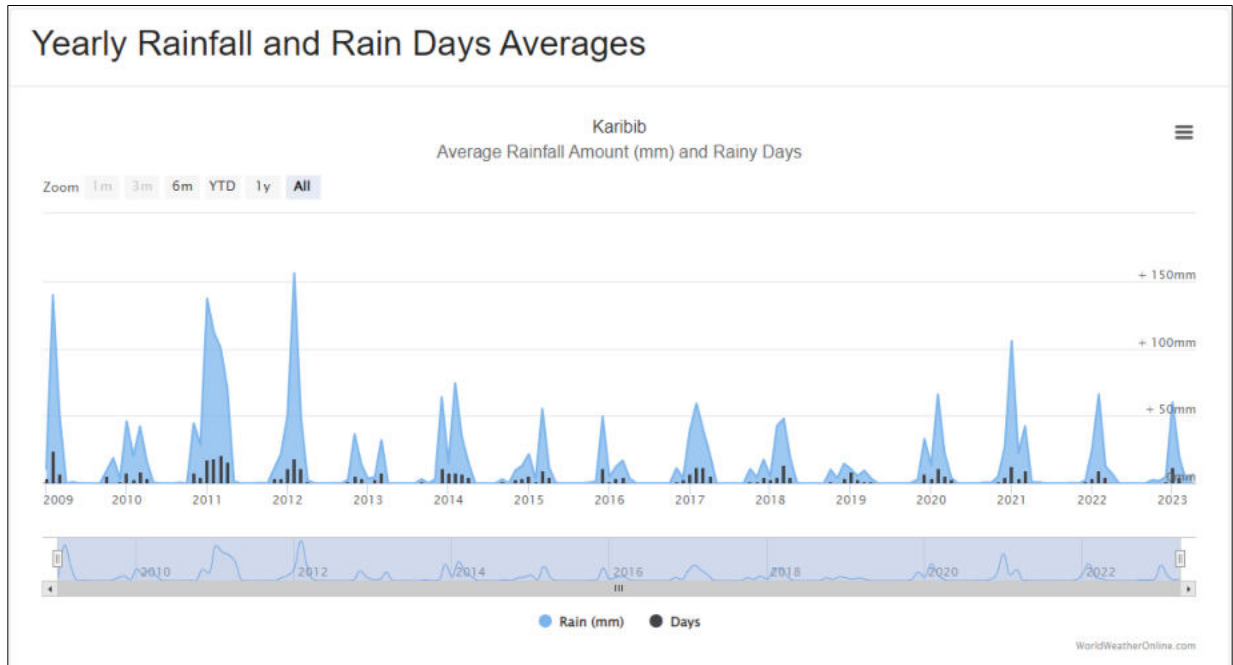


Figure 5-5: The rainfall and rain days averages for Karibib area (World Weather Online, 2023)

The rainfall averages for Karibib area are 53mm in February, followed by 37mm in March and 36mm in January - Figure 5-6.

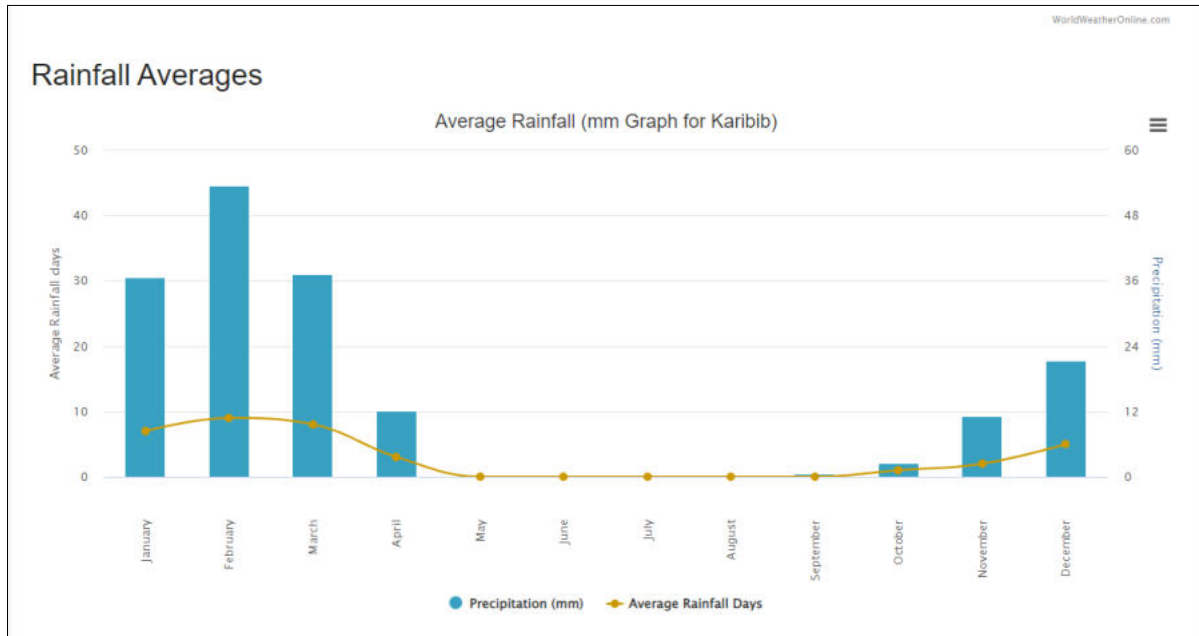


Figure 5-6: The rainfall averages for Karibib area (World Weather Online, 2023)

5.2.1.1 Air and Wind

Air: The current known sources of air pollution in the area are dust emissions from unpaved district and access roads within the area, and emissions from heavy vehicles on the local roads including the C33 and farm access roads, particularly in dry and windy months.

The wind rose for Karibib in Figure 5-7 below shows the wind rose and wind speed chart, indicating how many hours and days per year the wind blows from a certain direction. The predominant wind blows from South-West (SW) to North-East (NE)). The strong winds (with speed of more than 28km per hour) around the vicinity of the MCs area are experienced throughout the year for less than 5 days. The prevalent wind speeds ranging from 12 to 19km per hour are experienced throughout the year for more than 10 days.

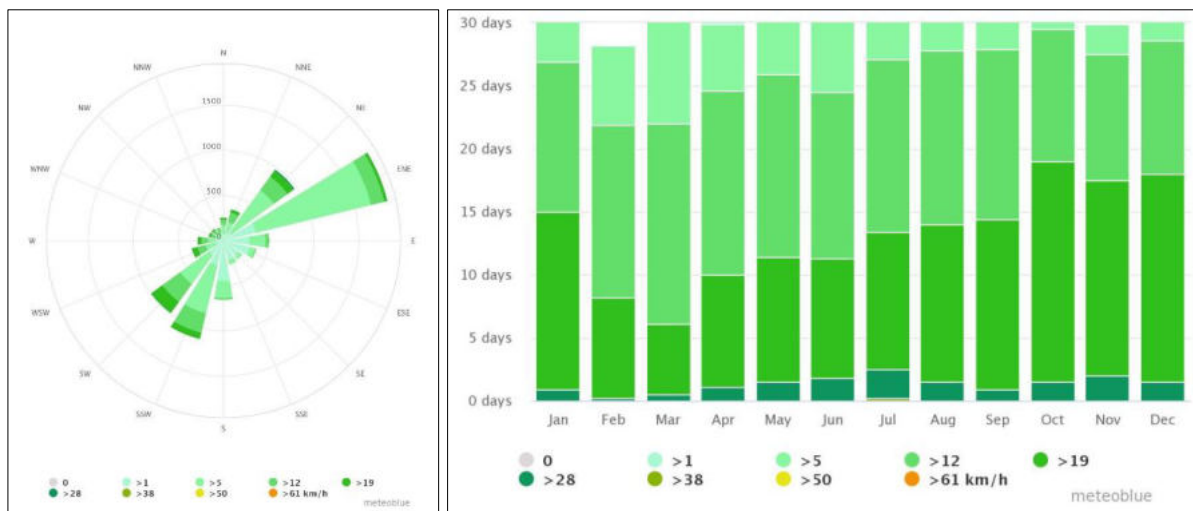


Figure 5-7: A wind rose and wind speed chart for Karibib area (Meteoblue, 2023)

5.2.2 Landscape and Topography

The MCs are within the Central-Western Plains as shown on the right upper corner of the map in Figure 5-8. The Central-Western Plains landscape stretches back from the coast. According to Mendelsohn *et al.* (2002), this broad area of plains extends inland for about 450km in places. The plains were largely formed by erosion cutting back into higher ground and carving out the catchment areas of several major rivers, which include the Khan, Omaruru, Swakop and Ugab Rivers.

The EPL is situated in a flat and hilly/mountainous area with elevations ranging between 950 and 1,453 meters above sea level as shown on topographic map in Figure 5-8 below.

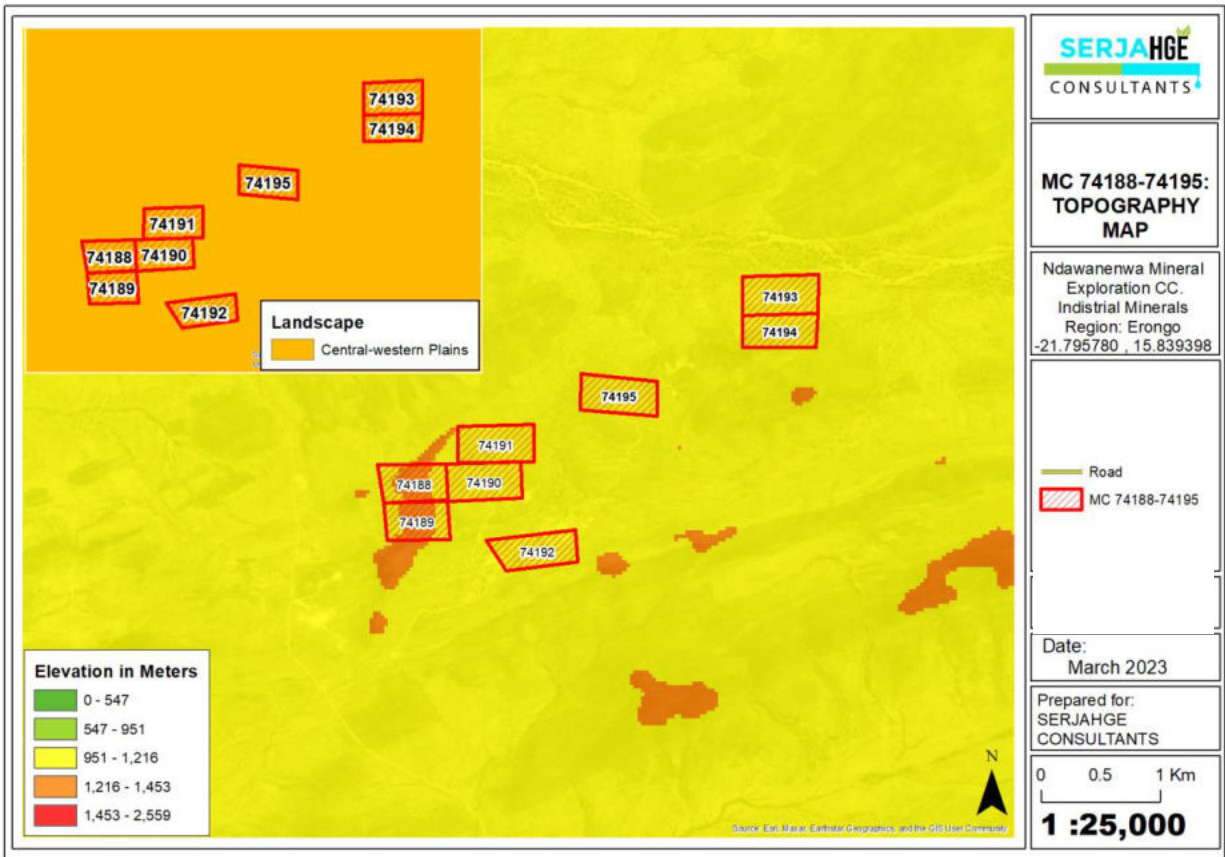


Figure 5-8: The landscape and elevation (topography) of the site and surrounding area

5.2.3 Geology and Soils

The Karibib-Usakos region is situated in the Damaran belt and has long been known to host a range of pegmatite occurrences. The pegmatites range from economically important pegmatites mined for Tin, Lithium, Niobium, Tantalum, Caesium, mica, feldspar, gem tourmaline and gem beryl; to simple pegmatites composed of microcline, microcline perthite. The pegmatites are also mined for quartz, and albite with some pegmatites locally containing large quantities of muscovite, schorl, and/or almandine (Grassi, 2014).

The MCs are found within the Karibib pegmatite belt and according to Keller (1991), this belt contains many economically important pegmatites, an exceptionally great number of them with Lithium-Iron-Manganese (Li-Fe-Mn) phosphates. Subdivision into the Kaliombo-Okongava, the Etusis, and the Dernburg-Abbabis-Naob portions seems to be convenient, not only territorially but also in respect of their mineralisation and/or country rocks.

The geological settings of the area (the rock units and their nature to potentially host ores of the sought commodities) triggered the need to explore and mine within the MCs. Figure 5-9 shows the local geology of the EPL, which characterized by marble, schists, quartzite, calc-silicate and graphitic schist.

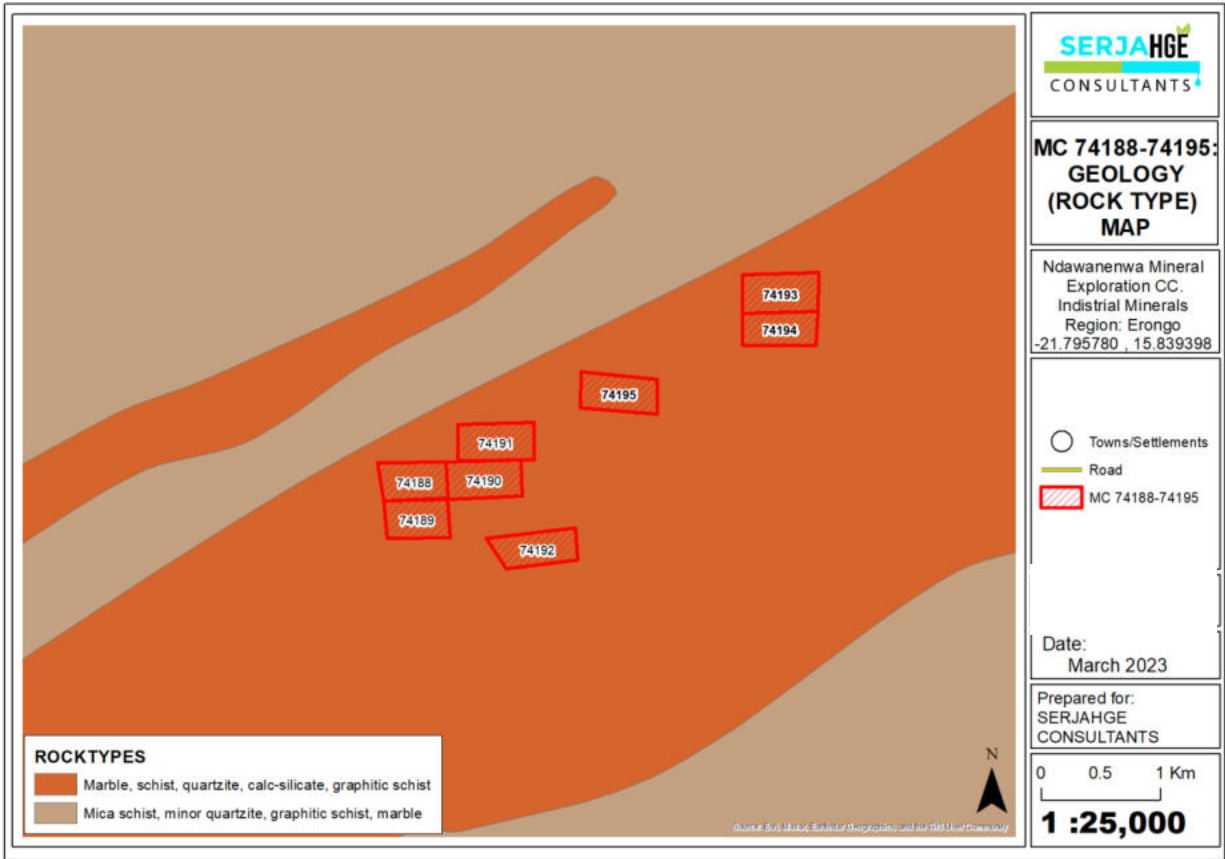


Figure 5-9: The geology of the site and surrounding area

The project site area is characterized by outcrops of marble bands shown in Figure 5-11.



Figure 5-10: The marble rock units on the Mining Claims



Figure 5-11: The spodumene mineral crystals within the marble units on the Mining Claims

In terms of soils, the site is covered by the rock outcrops or debris of disintegrated bedrocks (scree zones along the hill foot areas). The site soil map is shown in Figure 5-12.

The north western and south-eastern of the mining claims is overlain by the Petric Calcisols as shown on the dominant soil map. The first part of the soil name (Petric) means that these are fertile soils with relatively high water holding capacity. The second part of the soil name (Calcisols) which are characterized by a layer of translocated (migrated) calcium carbonate. This type of soil are soft and powdery or hard and cemented (Mendelsohn et al., 2002).

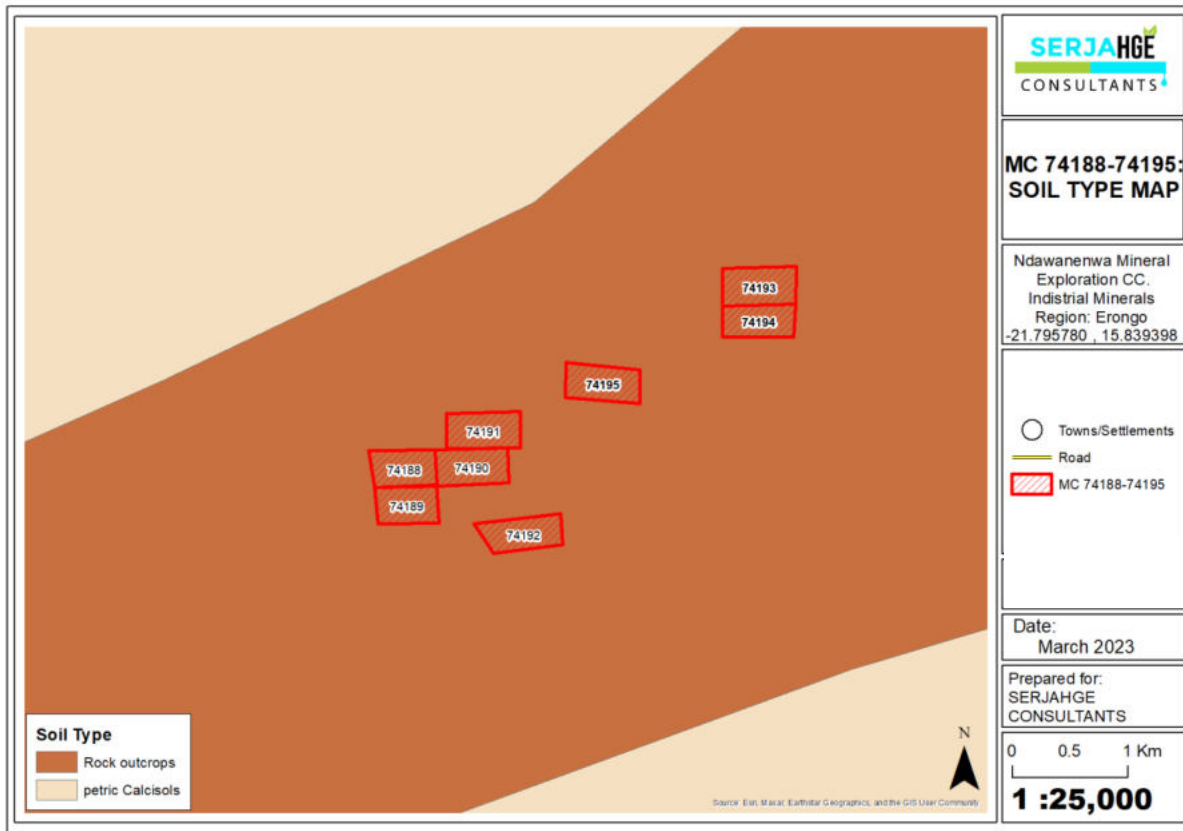


Figure 5-12: The dominant soil overlying the Mining Claims

Typical soil found within the MCs area are light brown/reddish brown sandy gravel mainly from disintegrated rock outcrops covered by medium grass cover - Figure 5-13.



Figure 5-13: Light brown gravel and debris from rock outcrops (scree) soils observed onsite

5.2.4 Water Resources: Groundwater (Hydrogeology) and Surface water (Hydrology)

With regards to groundwater (hydrogeology), the six of the MCs are mainly covered by the rock bodies with little groundwater potential as shown on the map in Figure 5-14. The low potential is attributed to the type of rock units underlying the six MCs (MC74188, 74187, 74189, 74190, 74191, 74192 & 74195), i.e., their non-fractured/faulted nature limit the storage, transmission, and flow of groundwater. Therefore, majority of the local rocks are not good aquifers.

Two of the MCs (MC74193 & MC74194) are found within the porous aquifers along the Khan River (also as shown on the map in Figure 5-14). These porous aquifers are mainly characterized by the primary aquifers of the alluvial sediments found along the River. According to the National Groundwater database, there are four boreholes within proximity of the MCs on Farm Daheim. However, the Farm owner indicated that there is only one known inactive borehole.

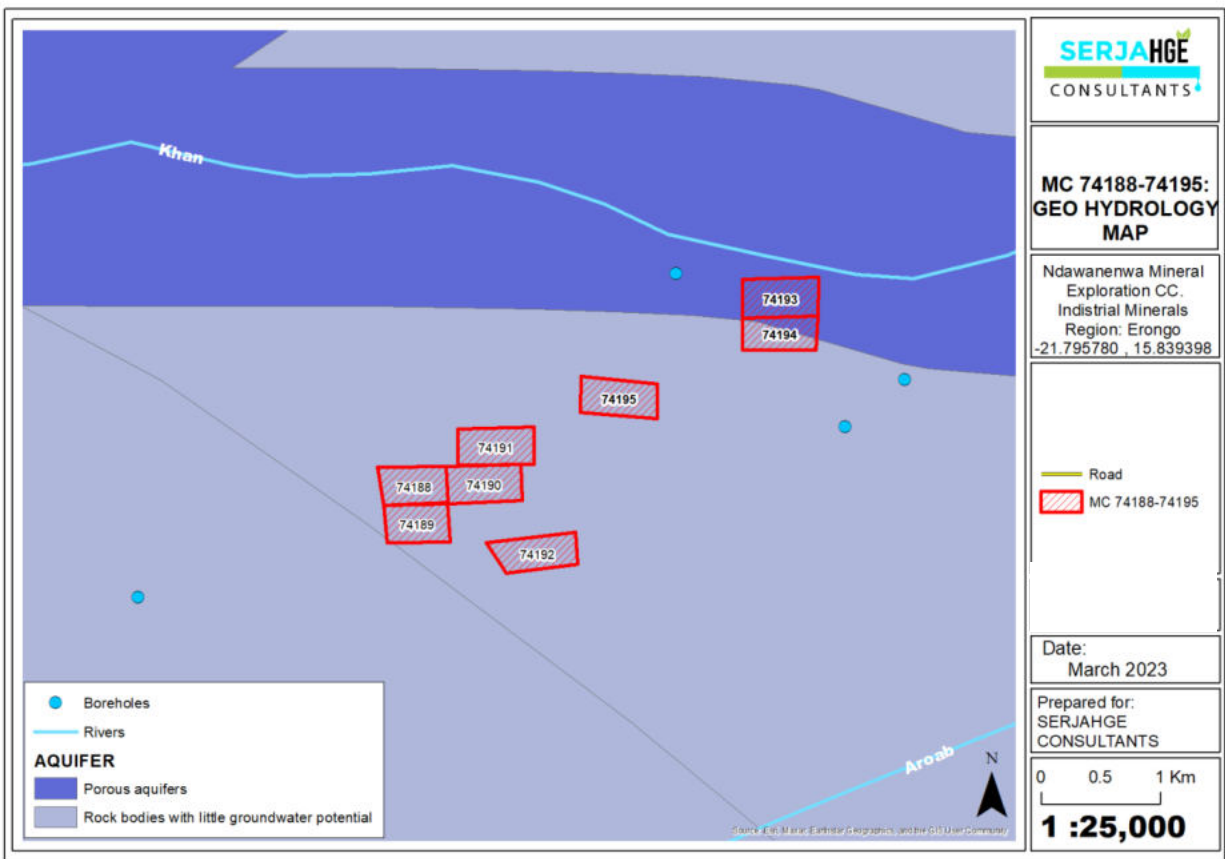


Figure 5-14: The surface and groundwater map of the MCs' area

5.3 Social and Economic Environment

5.3.1 Demography

The Erongo Region has a population of 150,809 people, accounting to a 7.1% of the country's total population of Namibia of 2,104,900 in 2011 (Namibia Statistics Agency (NSA), 2014).

The MCs site fall within the Karibib Constituency, which in 2011 had a population of 13,320 from 12,084 in 2001. The population of the Karibib Constituency increased with 10% since 2001 to 13,320 in 2011, which calculates to a 1% annual growth. The town of Karibib in 2011 had a population of 5,132 (Stubenrauch Planning Consultants, 2016).

5.3.2 Economic Activities

According to the Erongo Regional Council (2015), the economy of the Erongo Region mainly depends on mining, fishing, agriculture, and tourism. The fishing industry is the third largest economic sector contributed about 6.6% to the Gross Domestic Product (GDP). The Region's whole eastern part and certain western parts are characterized by livestock farming on commercial farms in the districts of Karibib, Usakos and Omaruru, and in the communal areas (Erongo Regional Council, 2015).

5.3.3 Employment

According to Stubenrauch Planning Consultants (2016), the main source of income within the Karibib Constituency is mostly from wages and salaries with 58%. The 2011 census shows that the private sector employs the majority of the employed population in the Karibib Constituency (51.22%) and 22.82% is employed within the agriculture sector and 22.95% is employed within the mining sector. The Karibib Constituency has an unemployment rate of 41%. The chart displaying the main occupation of employed population is shown in Figure 5-15 below.

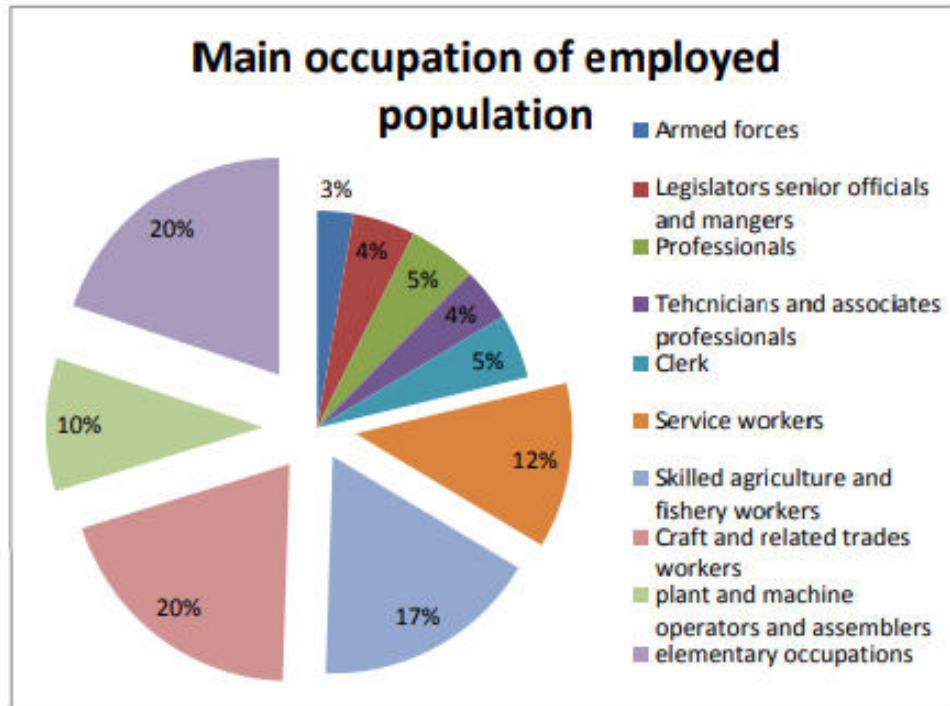


Figure 5-15: Main occupation of the employed population within the Karibib Constituency

The employed population of Karibib, and elementary occupations are the most common occupations (19.83%), followed by Craft and Related trades' workers (19.70%), Skilled Agricultural and Fishery workers (16.92%), Service Workers (12.35%) and Plant and Machine operators and assemblers (9.95%). Various occupation categories make up the remaining 21.24% (Excel Dynamic Solutions, 2022).

5.3.4 Mining Activities in the Erongo Region

Commodity mining operations are moderately held activities in the Erongo Region and provides livelihood to many of the Region's residents. There are already existing active mineral licenses (exploration and mining licenses, mining claims) around the vicinity of the MCs. The mining sector in the Region has been characterized by the establishment and expansion of several Uranium mines over the past decade due to an increased demand for this energy source. The Erongo Region also accommodates the mining of commodities such as gold, marble, granite, salt, and semi-precious stones (Erongo Regional Council, 2015).

5.3.5 Infrastructure and Services

The Erongo Region has good coverage of services and infrastructure. This includes a good road network from the central areas of the country and many access roads, tarred and untarred. The power is supplied either through ErongoRed in the coastal and central western areas of the Region.

There is also a good water reticulation system in both towns/village/settlements and rural (farm) areas. The water is mainly supplied through water supply schemes operated by NamWater either through boreholes (direct borehole or treated water) such as Omaruru Delta Aquifer Scheme for Omaruru Town and private boreholes on farms.

The summary of current services infrastructure in and around Omaruru include:

- **Water supply:** Water is supplied from moderate and low yielding solar powered boreholes on farms and the town of Karibib and some nearby water users are supplied from the NamWater Scheme.
- **Power supply:** The broader areas such as towns and settlements are supplied by ErongoRed regional electricity provider. Some areas (including some farms) depend on solar energy and generators for power supply.
- **Road network:** The area is connected to main C33 via farm access roads in the farms. Therefore, where necessary, it is anticipated that new access tracks may be created in some site areas to access the target sites for exploration and mining at the MCs on the Farm.

5.3.6 Archaeology and Heritage: Regional Perspective

Existing literatures and historical records shows that the project (site) area falls under the cultural landscape occurring in the context of Erongo Region. Putting it in context, the Erongo Region is highly endowed with archaeological and cultural heritage sites. In most part the Stone Age, archaeology is prevalent in the larger geographical area. However, no systematic research has been carried out around the proposed project site area to determine the archaeological and heritage potential of the landscape. Kinahan has carried out comparative research on rock painting shelters in Erongo Region from 'Snake Rock' in Hungorob Gorge Brandberg Mountain, 'Bushman Paradise' in Pondok Mountain, Spitzkoppe Mountain and at "Rainman Shelter" in Upper Otjohorong Granite Hill in 1998 (Nankela, 2020), the large part of the proposed project area remains unexplored to the outsiders. About 150 sites are recorded in the Erongo Region, and the Region is also endowed with Iron Age and contemporary heritage that needs to be ascertained later. According to Mushi (2021), Currently, Erongo Region has about 37 heritage sites which are listed as national monuments.

From a local context, there are no recorded nor mapped archaeological and heritage resources (sites and objects) within and around the MCs.

The public consultation and engagement process and means employed for the ESA Study is presented under Chapter 6.

6 PUBLIC CONSULTATION AND PARTICIPATION PROCESS

Public consultation and participation form an important component of an EIA process. It provides potential Interested and Affected Parties (I&APs) and stakeholders with an opportunity to comment on and raise any issues relevant to the project for consideration as part of the assessment process. This greatly assist the EAP (Environmental Consultant) to thoroughly identify and record potential impacts and to what extent further investigations are necessary. Public consultation can also aid in the process of identifying possible mitigation measures. The consultation for this project has been done under the EMA and its EIA Regulations and as per the following subsections.

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

Relevant and applicable national, regional, and local authorities, and other interested members of the public were identified. Pre-identified I&APs were contacted directly, while other parties who contacted the Consultant after project advertisement notices in the newspapers, were registered as I&APs upon their request.

6.2 Communication with I&APs, and Means of Consultation Employed

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

- A Background Information Document (BID) containing brief information about the proposed project was compiled and hand delivered to the Ministry of Mines and Energy (MME) accompanying the ECC application, and uploaded on the MEFT (ECC) Portal for project registration. The BID was also shared with the I&APs who requested for it.
- Project Environmental Assessment notices were published in The Namibia Media Holdings' *Market Watch newspapers (Allgemeine Zeitung, Die Republikein, and Namibian Sun)* dated 30 March 2023 and 05 April 2023, briefly explaining the activity and its locality, inviting members of the public to register as I&APs and submit their comments/concerns. Adverts are attached as Appendix C.
- The 8 MCs are located on a private farm. Therefore, there was no consultation meeting held. The only consultation done was with the farm owner who have provided consent for the proposed activities, and the hand written copy of the consent letter from the Daheim (Farm) Owner was submitted to the Proponent to the MME during application for the mining claims.

- Two A3 size information posters were pasted at the frequented places in Karibib Town, i.e., Town Council, Constituency Office notice boards (Figure 6-1) as well as Woermann Brock Supermarket community notice boards in Karibib - Figure 6-2.

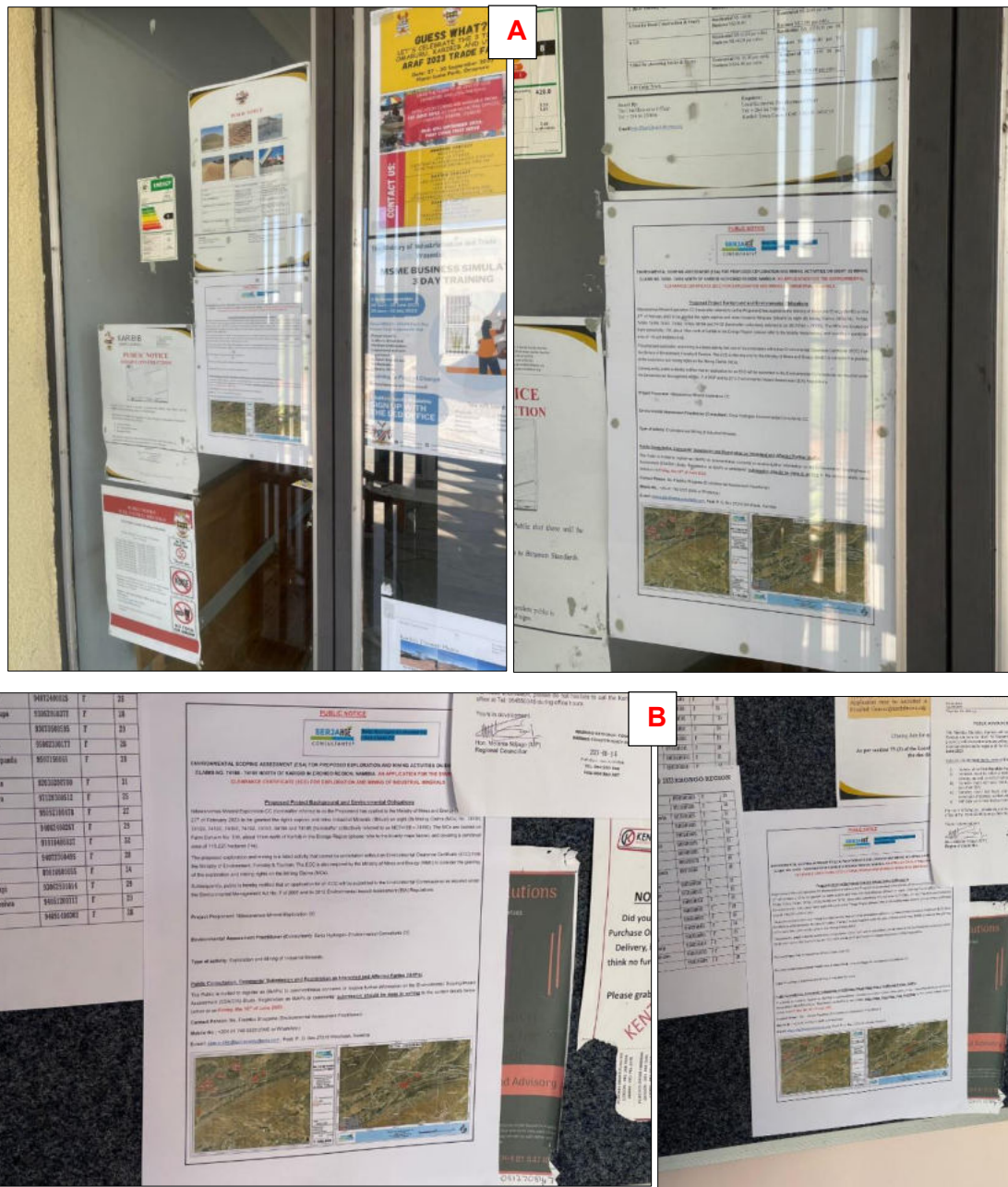


Figure 6-1: A3 ESA Study Posters at the; A - Karibib Town Council and B - Karibib Constituency Offices

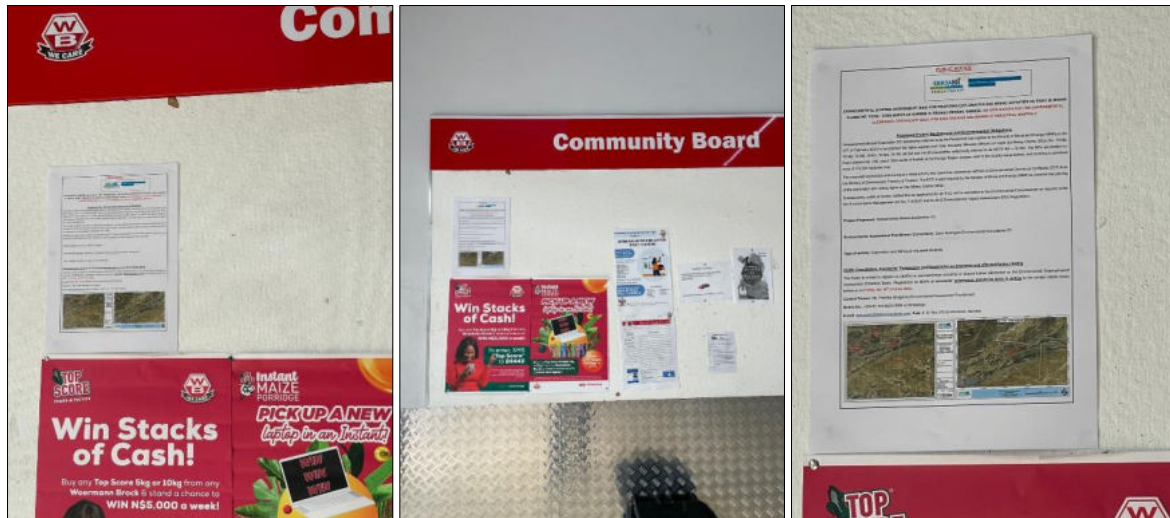


Figure 6-2: A3 ESA Study Posters at Woermann Brock Supermarket's community notice board in Karibib

6.3 Feedback and Issues from Interested and Affected Parties (I&APs)

The public consultation which entailed the submission of comments and registration as I&APs started on the 30th of March 2023 until the 02nd of May 2023. There were no comments submitted to Serja during the consultation period. However, a request for the BID was sent from one I&AP through the Karibib Town Council on the 12th of June 2023. The BID together with the scoping report and EMP as well as explanation thereto were shared with the I&AP the same day – see Appendix D.

The following chapter is a presentation of the identified impacts, their description, assessment methodology, and assessment.

7 IMPACTS IDENTIFICATION, ASSESSMENT AND MEASURES

7.1 Identification of Potential Impacts

The exploration and mining actions of lithium can already scar environments and disrupt local ecology and other biophysical and social impacts stemming from mining related activities.

For an environmental assessment, the focus is placed mainly on the negative impacts that are likely to affect the host environmental and social features. The assessment is done to ensure that these impacts are sufficiently addressed, and adequate mitigation measures are recommended thereto for implementation so that an impact's significance is brought under control, while maximizing the positive impacts. The potential positive and negative impacts that have been identified from the project activities are listed as follow:

Positive impacts:

- Local socio-economic development through employment creations to locals,
- Payment of land access fees to the landowner, this will also include payment of rental fees for setting up structures such as temporary office structures,
- Procurement of local goods and services by local businesses to generate income.
- Boosting of the local economic growth and regional economic development.

Negative:

- Physical disturbance of site soils,
- Impact on local biodiversity (fauna and flora); potential illegal harvesting of protected vegetation and wildlife hunting (poaching) and habitat disturbance in the area, as well as livestock theft,
- Impact on local biodiversity (fauna and flora) and habitat disturbance,
- Potential impact on water resources and soils (over-abstraction of water and pollution),
- Air quality (compromise the surrounding air quality) due to dust generated from the project activities such as drilling, trenching and movement of heavy trucks on unpaved access roads.
- Visual impacts due to unrehabilitated disturbed site areas as result of trenching, and drilling,
- Potential occupational & social health as well as safety risks (trenches and drilled holes risk to livestock, wildlife and people).
- Noise associated with project activities such as drilling,
- Accidental fire outbreaks related to the project activities.
- Vehicular traffic safety & impact on local roads,
- Environmental pollution (littering from solid waste as well as mishandled wastewater),
- Potential social nuisance and conflicts (theft, damage to properties, etc.), and
- Archaeological and cultural heritage impact (during trenching and drilling).

7.2 Impact Assessment Methodology

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

The identified impacts were assessed in terms of scale/extent (spatial scale), duration (temporal scale), magnitude (severity) and probability (likelihood of occurring), as presented in Table 7-1.

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

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

The recommended mitigation measures prescribed for each of the potential impacts contribute towards the attainment of environmentally sustainable operational conditions of the project for various features of the biophysical and social environment. The following criteria (in Table 7-1) were applied in this impact assessment:

Table 7-1: Criteria used for impact assessment (extent, duration, intensity and probability)

The Criteria used to assess the potential negative impacts				
Extent or (spatial scale) - extent is an indication of the physical and spatial scale of the impact.				
Low (1)	Low/Medium (2)	Medium (3)	Medium/High (4)	High (5)
Impact is localised within the site boundary: Site only	Impact is beyond the site boundary: Local	Impacts felt within adjacent biophysical and social environments: Regional	Impact widespread far beyond site boundary: Regional	Impact extend National or over international boundaries
Duration- Duration refers to the timeframe over which the impact is expected to occur, measured in relation to the lifetime of the project				
Low (1)	Low/Medium (2)	Medium (3)	Medium/High (4)	High (5)

The Criteria used to assess the potential negative impacts				
Immediate mitigating measures, immediate progress	Impact is quickly reversible, short-term impacts (0-5 years)	Reversible over time; medium term (5-15 years)	Impact is long-term	Long term; beyond closure; permanent; irreplaceable or irretrievable commitment of resources
Intensity, Magnitude / severity - Intensity refers to the degree or magnitude to which the impact alters the functioning of an element of the environment. This a qualitative type of criteria				
H-(10)	M/H-(8)	M-(6)	M/L-(4)	L-(2)
Very high deterioration, high quantity of deaths, injury of illness / total loss of habitat, total alteration of ecological processes, extinction of rare species	Substantial deterioration, death, illness or injury, loss of habitat / diversity or resource, severe alteration, or disturbance of important processes	Moderate deterioration, discomfort, partial loss of habitat / biodiversity or resource, moderate alteration	Low deterioration, slight noticeable alteration in habitat and biodiversity. Little loss in species numbers	Minor deterioration, nuisance or irritation, minor change in species / habitat / diversity or resource, no or very little quality deterioration.
Probability of occurrence - Probability describes the likelihood of the impacts occurring. This determination is based on previous experience with similar projects and/or based on professional judgment				
Low (1)	Medium/Low (2)	Medium (3)	Medium/High (4)	High (5)
Improbable; low likelihood; seldom. No known risk or vulnerability to natural or induced hazards.	Likely to occur from time to time. Low risk or vulnerability to natural or induced hazards	Possible, distinct possibility, frequent. Low to medium risk or vulnerability to natural or induced hazards.	Probable if mitigating measures are not implemented. Medium risk of vulnerability to natural or induced hazards.	Definite (regardless of preventative measures), highly likely, continuous. High risk or vulnerability to natural or induced hazards.

7.3 Impact Significance

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

Once the above factors (Table 7-1) have been ranked for each potential impact, the impact significance of each is assessed using the following formula:

SP = (magnitude + duration + scale) x probability

The maximum value per potential impact is 100 significance points (SP). Potential impacts were rated as high, moderate, or low significance, based on the following significance rating scale (Table 7-2).

Table 7-2: Impact significance rating scale

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

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

The assessment of the project phases is done for both pre-mitigation (before implementing any mitigation) and post-mitigation (after mitigations are implemented). The objective with the mitigation measures is to firstly avoid the risk and if the risk cannot be avoided, mitigation measures to minimize the impact are recommended. Once the mitigation measures have been applied, the identified risk will be of low significance.

7.4 Description and Assessment of Potential Impacts

The potential impacts from the proposed project activities are described, and assessed in Table 7-3. The management and mitigation measures are in a form of management action plans are provided in the Draft EMP.

Table 7-3: The Description and Assessment of the impacts of project activities on the biophysical and social environment

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
Positive Impacts											
Employment creation	The project activities will create employment to some locals from exploration throughout to mining. This will include casual labourers, technical assistants, operators, cooks, cleaners, etc.	L / M - 2	L / M - 2	L / M - 4	L - 1	L - 8	M / H - 4	H - 5	M - 6	H - 5	H - 75
Land access use fees to farmers for socio-economic development	Payment of land use fees to the farmer in accordance with the Mining Act would generate an income for the farm during exploration and mining duration.	L / M - 2	L / M - 2	L / M - 4	L - 1	L - 8	M / H - 4	H - 5	M - 6	H - 5	H - 75
Empowerment of local businesses	Procurement of local goods and services (such as site clearing, cleaning, etc.) by local business will promote local entrepreneurship empowerment and local economic development (income generation).	L / M - 2	L / M - 2	L / M - 4	L / M - 2	L - 16	M - 3	M / H - 4	L / M - 4	M / H - 4	M - 44
Donating of water boreholes	During exploration drilling, it is likely that groundwater would be encountered in some exploration	L / M - 2	L / M - 2	L / M - 4	L - 1	L - 8	M - 3	M / H - 4	L / M - 4	M / H - 4	M - 44

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
from exploration and drilling and improving some farm infrastructure s	<p>holes. Therefore, the Proponent will notify the farmer and boreholes donated to the farmer for their own use.</p> <p>Where access needs to be improved, such as farm sections areas with small gates for some project vehicles and machinery, new gates will be installed by the Proponent, with the farmer's consent.</p>										
Negative (Adverse) Impacts											
Disturbance to grazing areas on the MCs	The MCs are within the commercial farm (Farm Daheim). Although there are no animals on the Farm, there are animals on the nearby farms such as livestock and wildlife. Given that the proposed activities will be concentrated on Farm Daheim where there are no animals, this impact is very minimal to none.	M: -3	M: -3	M: -6	M / H: 4	M: -48	L / M: -2	L / M: -2	L / M: -4	L / M: 2	L: -16
Physical disturbance to the site soils	The excavations and land clearing to enable siting of project structures and equipment will potentially result in soil disturbance which will leave the site soils exposed to erosion.	M - 3	M / H - 4	L / M - 4	M / H - 4	M - 44	L / M - 2	L / M - 2	L / M - 4	L / M - 2	L - 16

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
	This impact would be probable at site areas with no to little vegetation cover to the soils in place. The movement of heavy vehicles. The movement of heavy vehicles and equipment may lead to compaction of the soils during exploration. This will, however, be a short-term and localized impact.										
Impact on Biodiversity: Wild Fauna and Flora	<p><u>Fauna:</u> If activities such as trenching and drilling activities are not carefully conducted, this would result in land degradation. The degradation would lead to habitat loss for a diversity of flora and fauna onsite. However, exploration activities will be limited specific target areas only within the MCs.</p> <p>The presence and movement of the project workforce and operation of project equipment and heavy vehicles would disturb not only the domestic animals (livestock) grazing at the explored sites of MCs, but also the wildlife present on the farm. Not only the disturbance due to</p>	M: -3	M: -3	M: -6	M / H: 4	M: -48	L / M: -2	L / M: -2	L / M: -4	L / M: 2	L: -16

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
	<p>human and vehicle movements, but also potential illegal hunting (poaching) of local wildlife by project related workers. This could lead to loss or number reduction of specific faunal species which also impacts tourism in the community.</p> <p><u>Flora:</u> Vegetation would be impacted through clearing to create exploration access roads, setting up project equipment and infrastructures, and actual activities such as drilling, trenching and quarrying.</p> <p>Drilling activities may potentially impact vegetation through the fallout dust settling on the leaves of the plants, hindering, or preventing photosynthesis, which eventually affects the grazing of herbivores on the farm. The clearing of vegetation, where deem necessary will be limited to the specific route and minimal, therefore, the impact will be localized, site-specific, therefore manageable.</p>										

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
Air Quality: Dust Generation	There is a potential impact of dust emanating from site access roads when transporting exploration equipment and supply to and from site. This may compromise the air quality in the area. Additionally, activities carried out as part of the exploration works such as drilling would contribute to the dust levels in the air.	M: -3	M: -3	M / L: -4	M / H: 4	M: -40	L / M - 2	L / M - 2	L - 2	L / M - 2	L - 12
Visual impact: Scenic view of the area for Tourism	The sight of unrehabilitated site areas may be an eyesore to both locals, tourists and travelers alike on C33. This impact is considered minimal as the MCs areas are small in size compared to other mineral licenses such as exploration and mining licenses.	M - 3	M - 3	M - 6	M / H - 4	M - 48	L / M: - 2	L / M: -2	L / M: -4	L / M: 2	L: -16
Water Resources Demand and Use	The abstraction of more water than it can be replenished from low groundwater potential areas would negatively affect wildlife watering in the area that depend on the same low potential groundwater resource (aquifer). The impact of the project activities on the resources would	M - 3	M - 3	M - 6	M / H - 4	M - 48	L / M - 2	L / M - 2	L - 2	L / M - 2	L - 12

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
	be dependent on the water volumes required by each project activity. Exploration and mining of industrial minerals are water-consuming compared to other techniques like reverse circulation. Given the fact that the Farm and MCs area is underlain by rock units with low groundwater potential.										
Soil and Water Resources Pollution	The proposed exploration activities are associated with a variety of potential pollution sources (i.e., lubricants, fuel, and wastewater) that may contaminate/pollute soils and eventually groundwater and surface water. The anticipated potential source of pollution to water resources from the project activities would be hydrocarbons (oil) from project vehicles, machinery, and equipment as well as potential wastewater/effluent from exploration related activities. The spills (depending on volumes spilled on the soils) from these machinery, vehicles and equipment could be washed	M: -3	M: -3	M: -6	M / H: 4	M: -48	L / M: -2	L / M: -2	L / M: -4	L / M: 2	L: -16

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
	in surface water bodies such as rivers and streams. The pollution may eventually infiltrate into the ground and pollute the fractured or faulted aquifers. This impact would occur during heavy rainy season when surface runoff would be inevitable. However, it should be noted that the scale and extent/footprint of the activities where potential sources of pollution will be handled is relatively small. Therefore, the impact will be moderately low.										
Waste Generation (Environmental pollution)	Waste types such as solid, wastewater and possibly hazardous will be produced onsite during exploration. If the generated waste is not disposed of in a responsible way, land pollution may occur onsite or around the site. If solid waste such as papers and plastics are not properly stored or just thrown into the environment (littering), these may be consumed by animals on the farm which could be detrimental to their health. Improper handling, storage and	M: -3	M: -3	M / L: -4	M / H: 4	M: -40	L - 1	L - 1	L - 2	L / M - 2	L - 8

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
	disposal of hydrocarbon products and hazardous materials at the site may lead to soil and groundwater contamination, in case of spills and leakages. Therefore, the exploration programme needs to have appropriate waste management for the site. To prevent these issues, biodegradable and non-biodegradable wastes will be stored in separate containers and collected regularly for disposal at a nearest recognized waste management facilities										
Occupational and Community Health and Safety Risks	Project personnel (workers) involved in the exploration activities may be exposed to health and safety risks. These are in terms of accidental injury, owing to either minor or major (i.e., involving heavy machinery or vehicles) accidents. The heavy vehicle, equipment and fuel storage area should be properly secured to prevent any harm or injury to the Proponent's personnel, farm residents and animals. Another potential risks	M - 3	M - 3	M - 6	M / H - 4	M - 48	L / M - 2	L / M - 2	L - 2	L / M - 2	L - 12

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
	<p>to both people and animals within the MCs are unfenced exploration and mining trenches or trenches that are not backfilled after completing the sampling works. Unsecured project trenches and even uncapped holes could pose a risk of people or animals falling into the open trenches leading to injuries.</p> <p>The use of heavy equipment, especially during drilling and the presence of hydrocarbons on sites may result in accidental fire outbreaks. This could pose a safety risk to the project personnel and locals too.</p> <p>Furthermore, considering the current unemployment rate of youth in Namibia, people from other areas in different regions may learn of the project and be forced to go look for work. The influx of people into the project area may also lead to sexual relations between these out-of-area workers and the locals. This would lead to the spreading of</p>										

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
	sexual transmitted diseases (i.e., HIV/AIDS) when engaging in unprotected sexual intercourse.										
Fire outbreaks	During exploration, there is a risk of accidental fire outbreaks related to the project activities. These could be from unattended open fire used for preparing food (if the drilling crew is accommodated onsite), smokers who are part of the exploration crews failing to completely put out their cigarettes which may result in a fire spreading over the farm areas and cause damage.	M - 3	M - 3	M - 6	M / H - 4	M - 48	L / M - 2	L / M - 2	L - 2	L / M - 2	L - 12
Vehicular Traffic Safety	The local roads such as C33 is the main transportation routes for all vehicular movement in the claims area. There would be a potential increase in traffic flow especially during the detailed exploration stage of the project activities, due to the delivery of supplies and services on site. These service and supplies will include but not limited to water, waste removal, procurement of	M - 3	M / H - 4	L / M - 4	M / H - 4	M - 44	L / M - 2	L / M - 2	L - 2	L / M - 2	L - 12

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
	<p>exploration machinery, equipment, and others.</p> <p>Depending on the project needs, trucks, medium and small vehicles will be frequenting the area to and from project sites on the MCs. This would potentially increase slow moving heavy vehicular traffic along these roads.</p> <p>The exploration works will be undertaken in stages, on certain days of the week, few vehicles and the work will be temporary. Therefore, the risk is anticipated to be short-term, not frequent, and therefore of medium significance. However, the traffic would increase during mining.</p>										
Impact on local road use	<p>The project activities will mean an increased movement of heavy trucks and equipment on local roads which would exert more pressure on these roads. These local roads in remote areas are normally not in a good condition already for light vehicles, and the additional vehicles such as heavy ones</p>	M: -3	M: -3	M / L: -4	M / H: 4	M: -40	L - 1	L - 1	M / L - 4	M / L -2	L - 12

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
	may make it worse and difficult to be used by small (vehicles) that already struggled on the roads prior. This will be a concern if maintenance and care is not done during the exploration phase. The impact would be short-term (during exploration only) and therefore, manageable										
Noise and vibration from drilling	There is a potential of noise from certain activities, especially drilling and trenching, which may be a nuisance to surrounding communities (farm houses) and farm animals. Excessive noise and vibrations without any protective measures in place can be a health risk to workers on site. The exploration equipment used for drilling on site is of medium size and the noise level is bound to be limited to the site only, therefore, the impact likelihood is minimal. Without any mitigation, the impact is rated as of medium significance.	M - 3	M - 3	M - 6	M / H - 4	M - 48	L - 1	L / M - 2	L - 2	L / M - 2	L - 10
Social Nuisance: Local	The presence of some out-of-area workers may lead to social annoyance to the local	M - 3	M - 3	M - 6	M / H - 4	M - 48	L - 1	L - 1	M / L - 4	M / L - 2	L - 12

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
Property intrusion and Disturbance or Damage	community. Not only out-of-area but locals too could intentionally trespass into private properties of the locals and damage them. The private properties of the farmers could be houses, unauthorized fences, or cause damage to animals (livestock and wildlife). The unpermitted and unauthorized entry to private properties resulting in property theft, vandalism (damage) may cause crashes between the affected property farmer(s) and the Proponent.										
Archaeological and Heritage resources	The potential impact on heritage resources would be through the inadvertent unearthing of buried objects especially during trenching and drilling would lead to a loss of heritage resources. There are no known or observed surface heritage sites or objects within the MCs. However, the absence of such resources on the surface does not mean that such or some such sites cannot be encountered during excavation works. Therefore, the necessary measures will be	M / H - 4	M - 3	M - 6	M - 3	M - 39	L - 1	L / M - 2	L - 2	L / M - 2	L - 10

Impact	Impact Description	Impact Assessment									
		Pre-mitigation Rating					Post-mitigation Rating				
		Extent	Duration	Intensity	Probability	Significance	Extent	Duration	Intensity	Probability	Significance
	implemented. This includes the Chance Finds Procedure attached to the Draft EMP.										

7.5 Cumulative Impacts Associated with the Proposed Exploration

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

Similarly, to many other exploration projects, some of the cumulative impact to which the proposed project and associated activities potentially contribute are the:

- Impact on road infrastructure: The proposed project activities will contribute cumulatively to various existing activities such as farming activities, and travelling associated with tourism, local daily routines and other road uses associated with existing mineral licenses and other projects in the area. The contribution of the proposed project to this cumulative impact is however not considered significant given the short duration, and local extent (site-specific) of the intended mineral exploration activities.
- The use of groundwater: While the contribution of this project to groundwater abstraction will not be significant (as the significant amount of water will be not abstracted from the MCs, particularly the six MCs with low groundwater potential), mitigation measures to reduce water consumption during exploration are essential.

8 CONCLUSIONS

The ESA Study for the proposed exploration and small-scale mining activities on MC74188-74195 was undertaken in accordance with the EMA and its 2012 EIA Regulations. Some key potential positive and negative impacts were identified. The key negative impacts were described, assessed and appropriate management and mitigation measures made thereof for implementation by the Proponent, their contractors, and workers.

The public was consulted as required by Section 21 to 24 of the EIA Regulations by placing notices in three newspapers (*Allgemeine Zeitung, Die Republikein, and Namibian Sun*) dated 30 March and 05 April 2023.

There were no comments or issues raised by I&APs. Regardless, mitigation measures have been provided thereof to avoid and/or minimize their significance on the environmental and social components.

Impact Assessment: The key negative impacts were described, assessed and appropriate management and mitigation measures made thereof for implementation by the Proponent, their contractors, and workers to avoid and/or minimize their significance on the environmental and social components. The potential

negative impacts assessed have a medium rating significance, given the short-duration of exploration and mining. The effective implementation of the recommended management and mitigation measures accompanied by monitoring will greatly aid in minimizing the significance of adverse impacts that cannot be avoided completely (from medium rating to low). The implementation of measures to maximize the positive impacts will also increase the significance during exploration and mining.

The Scoping assessment (ESA) Study was deemed sufficient and concluded that no further detailed assessments are required to the ECC application for the proposed project activities.

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

It is therefore, recommended that the proposed exploration and mining activities be granted an ECC, and provided that:

- All the management and mitigation measures provided herein are effectively and progressively implemented and monitored.
- All required permits, licenses and approvals for the proposed activities should be obtained as required. These include permits and licenses for land access agreements, services provision agreements to explore and ensuring compliance with these specific legal requirements.
- The Proponent, their project workers or contractors comply with the legal requirements governing their project and its associated activities and ensure that project permits and or approvals required to undertake specific site activities are obtained/renewed as stipulated by the issuing authorities.
- Site areas where project activities have ceased are rehabilitated, as far as practicable, to their pre-exploration state. This includes the levelling of stockpiled topsoil, backfilling of exploration and mining trenches and closing/capping of project holes.

To maintain the desirable rating and that the potential impacts are under control, the implementation of management and mitigation measures should be monitored by their Environmental Control Officer (ECO) and audited by an Environmental Consultant on a bi-annual basis. The monitoring of this implementation will be done to maintain the reduce impacts' rating or maintain low rating and ensure that all potential impacts that might arise during implementation are properly identified in time and addressed immediately.

9 LIST OF REFERENCES

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