

**A SCOPING REPORT ON THE ENVIRONMENTAL IMPACT ASSESSMENT FOR
THE PROPOSED DEVELOPMENT OF MARBLE AND GRANITE MINE ON MINING
LICENCE (ML236), KARIBIB, ERONGO REGION**



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DOCUMENT DATA SHEET

Title	THE ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED DEVELOPMENT OF MARBLE AND GRANITE MINE ON MINING LICENCE (ML236), KARIBIB, ERONGO REGION		
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EXECUTIVE SUMMARY

Tipton Investments (Pty) Ltd hereinafter referred to as The Proponent intends to carry out dimension stones (marble and granite) mining operations on Mining License (EPL) no. 236. The ML is located about 45 km southwest of the Town of Karibib and covers an area of about 314, 7 Ha. The area falls under the Karibib Constituency jurisdiction and extends across three (2) commercial farms namely: Etusis (no. 75), and Kubas (no. 77). Tipton Investments (Pty) Ltd appointed Chem Papers CC to conduct the necessary assessments including public participation.

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

The site of the proposed mining activities already hosts other authorized dimension stone mining activities, therefore the natural setting of the area is accustomed to similar operations and that potential negative impact of the proposed project on the natural environment of the surrounding area will be negligible. An alternative to the proposed mining activity would be to allocate the land-usage to other income generating activities such as agriculture and tourism activities. The proposed project will strictly employ locals from nearby towns and settlements.

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1. Introduction

1.1. Project background

Tipton Investments (Pty) Ltd is a Namibian Registered company. It is the holder of Exclusive Prospecting License (EPL 7728) located in Karibib District, Erongo Region. The EPL has been valid since 16/10/2020 and will expire on the 15/10/2023. After the completion of the exploration programme aimed at delineating potential for marble and granite economic resources within the EPL area, the company has applied to the Ministry of Mines and Energy (MME) for Mining License (ML 236). Once the mineral rights for ML236 has been granted and the Environmental Clearance Certificate has been issued by Ministry of Environment, Forestry and Tourism (MEFT), mine development and the subsequent production phase and processing will follow.

1.1.1 Project Description

The exclusive prospecting license area (EPL 7728) is 424, 3 Ha and the proposed mining license area (ML236) covers 314, 7 Ha. The mining licence area has been found to host marble and granite of economic value of over 12 million tons and 35 million tons of marble and granite respectively. Lithology envisaged for dimension stone quarrying are the marble of the Karibib Formation and the non-foliated biotite granite Cambrian age. The proponent intends to implement a surface quarry for marble and granite on three quarries at the proposed project site. The main marble unit designated quarry 1 (figure 3) is envisaged to be the initial focal point mining or be mined concurrently with other two quarries designated quarry 2 and 3, depending on the market demand. Mining will proceed by means of quarrying with a diamond wire saws and stone cutting machines for cutting off rectangular blocks. Mined blocks will be transported to the Port of Walvis Bay is situated 255 km from the proposed mining area by public road.

1.1.2 Environmental Consultant

Chem Papers Investments Consulting cc (Reg. No. CC/2010/7856) is a wholly Namibian owned company, established in 2012 to provide consulting services to various public and private sectors

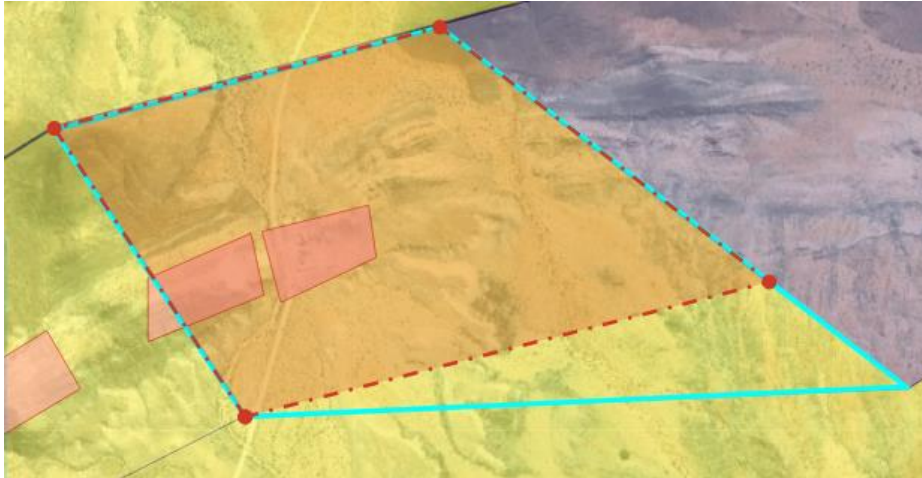


Figure 2: Google maps indicating geology and ML application boundary represented by red.

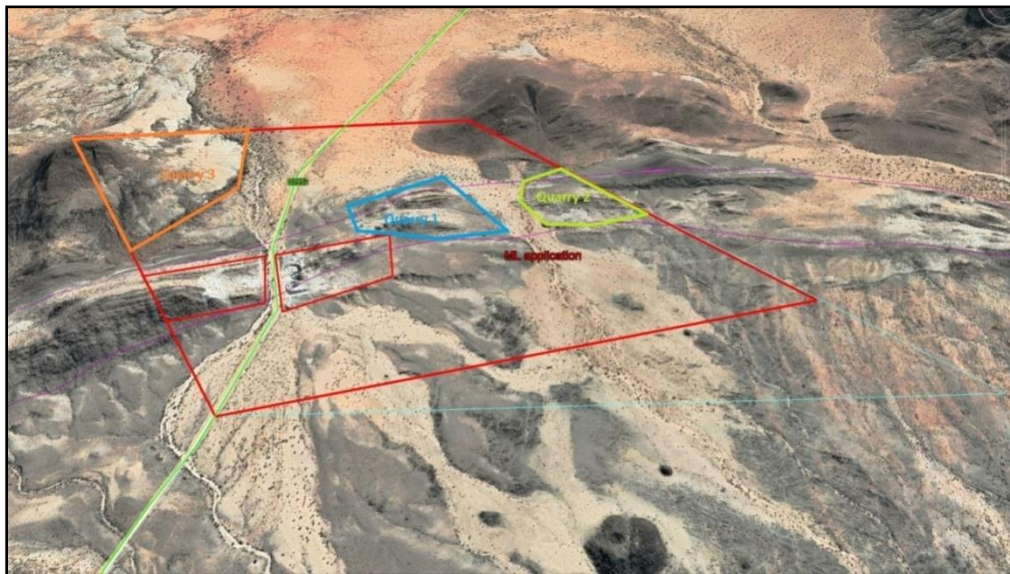


Figure 3: Google image showing location of the proposed quarry sites on ML area.

1.3 Infrastructure and Services

1.3.1 Electricity

At this stage, electricity requirements for the project are minimal. The bulk of the power supply to the exploration site will be sourced from the proponent's own generator. Electricity needs will be supplied by generators and solar installations while diesel and petrol will be the main sources of

fuels and readily available in the Town of Karibib. The power requirements for the proposed project will be minimal as power will only be required for: emergency lighting, powering small machinery during the mining process and power supply for temporary office block or container if necessary.

1.3.2 Water Supply

The proposed mining operations are unlikely to require major water. Water requirements will be provided from the available local water resources supplied by private boreholes to be drilled with permission from the Department of Water Affairs in the Ministry of Agriculture, Water and Land Reform or sourced from the town of Karibib and transported to site. Water containers will be brought on site and utilised whenever necessary. The water will mostly be used for general consumption and cleaning. The water used for granite drilling or wire-saw cutting will be recycled.

1.3.3 Roads

The proposed ML area is accessible via the D1953 gravel road which is connecting to C32 gravel road from the town of Karibib. The two gravel roads are well-maintained. The B2 national highways connect Karibib to the port of Walvisbay which is located 210 km to the west. Access and transportation, whether by road or rail, are easily accessible within the region and within Namibia. The nearest railhead is at Karibib.

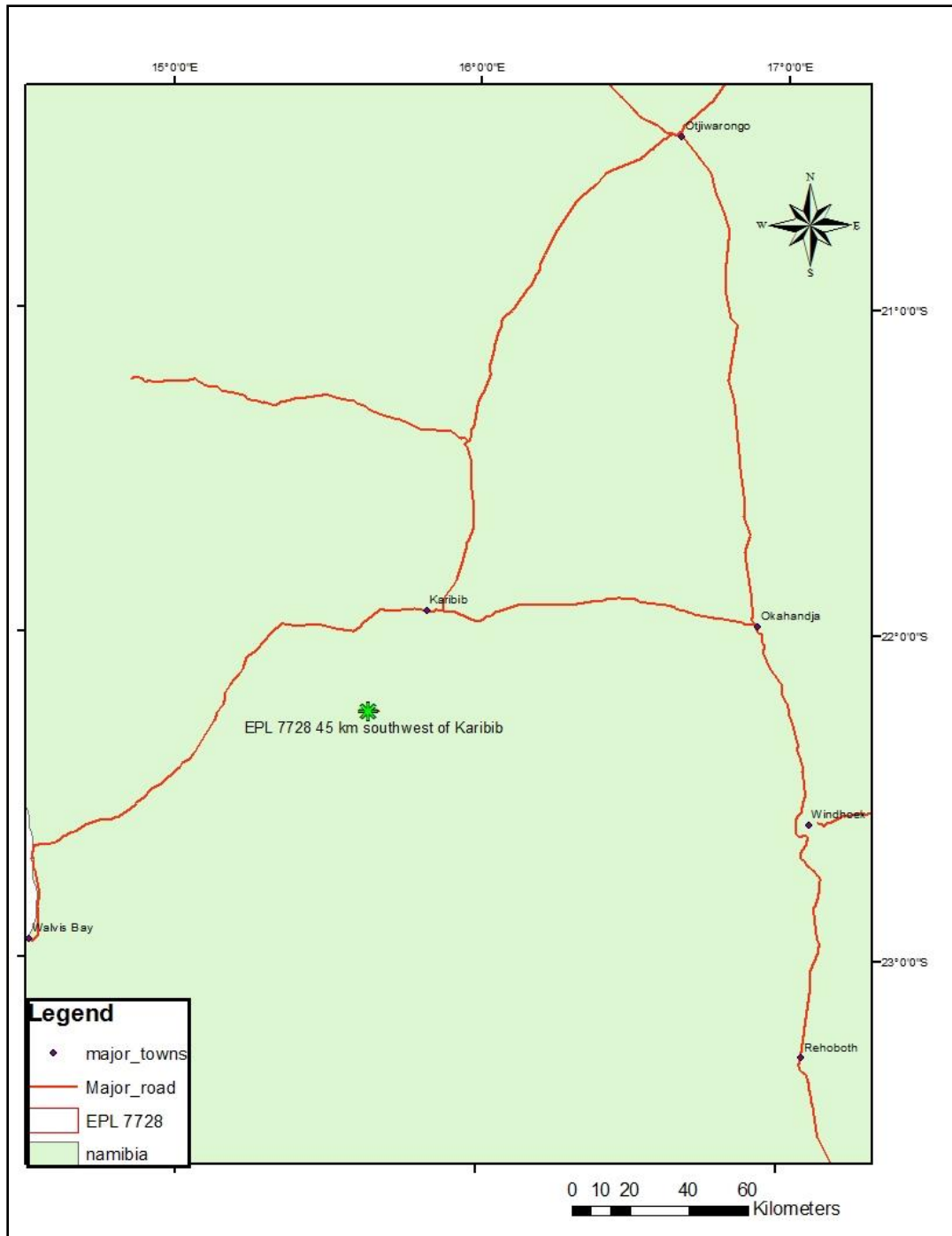


Figure 4: Major roads and towns near EPL7728.

1.3.4 Supporting infrastructure, transportation and accommodation

The proponent will utilize containerized systems for onsite administration and offices. This will later be upgraded to permanent structure as time goes on. Consumables and lubricants will be stored in a designated area within a container. These substances will only be used for mechanical purposes and are assumed to be non-hazardous. Diesel will be delivered to a small temporary on-site fuel storage facility by road transport and offloaded into the storage tanks by offloading pumps.

All the staff members except the security personnel will be based in Karibib town. Karibib based staff accommodation services will use the already existing properties in the town. Staff transport arrangements from Karibib to the mine sites will be provided by the proponent. The Proponent has planned to operate both the mining (quarrying), cutting, and polishing plant during normal working hours of the day.

Provision will be made for 4 off-road vehicles, an excavator and a front-end loader. The proponent's vehicle fleet will be optimised as the project advance to other quarries. Other tools include a genset, wire saws, an electric compressor and a water jacking plant. Portable fire-extinguishers will be fitted on all vehicles as well as in the mobile containers where possible. Provision will be made for two-way radios to enable the drill rig operators and the onsite staff to communicate effectively.

1.4 Environmental Impact Assessment Requirements

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

1.5 Purpose of the Scoping Report

The scoping report is prepared for the Environmental Impact Assessment for marble and granite quarrying on an area which is located 45 km Southeast of Karibib on farm Etusis 75 and farm Kubas 77. Environmental scoping is a critical step in the preparation of an EIA for the proposed mining activities. The scoping process identifies the issues that are likely to be most important during the EIA and eliminates those that are of little concern. The scoping process shall be concluded with the establishment of terms of reference for the preparation of an EIA, as set out by the Ministry of Environment and tourism. The purpose of this scoping report is to:

- ❖ Identify any important environmental issues to be considered before the commencement of the proposed mining activities in ML236.
- ❖ To identify appropriate time and space boundaries of the EIA study.
- ❖ To identify information required for decision-making.

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

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

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

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

- ❖ Qualified opinions from professional studies.

1.6 Terms of Reference

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

- ❖ Legal and policy review; Identify all legislation and guidelines that have reference to the proposed project.
- ❖ Identify existing environmental (both bio-physical and socio-economic) conditions of the area.
- ❖ Inform Interested and Affected Parties (I&APs) and relevant authorities of the details of the proposed development and provide them with a reasonable opportunity to participate during the process.
- ❖ Consider the potential (both bio-physical and socio-economic) impacts of the development and assess the significance of the identified impacts.
- ❖ Document pinions and concerns raised by I&AP's and stakeholders.
- ❖ Outline management and mitigation measures in an Environmental Management Plan (EMP) to minimize and/or mitigate potentially negative impacts.
- ❖ Submit the final scoping report to the competent authority and the Environmental Commissioner.

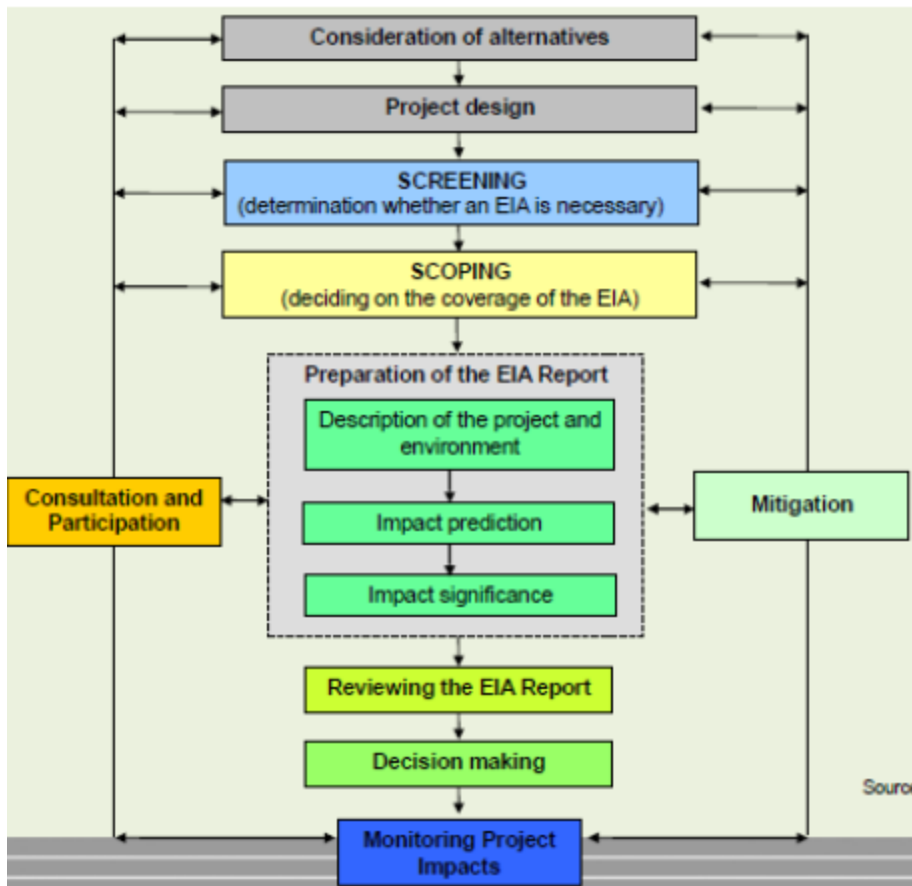


Figure 5: General schematic presentation of the Environmental Impact Assessment process in Namibia.

1.6.1 Environmental assessment approach and methodology

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

and potential impacts for further investigation and assessment, and to develop the terms of reference for specialist studies to be conducted in the Impact Assessment Phase if necessary. The steps undertaken during the Scoping Phase are summarized below.

1.6.1.1 Project initiation and screening

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

1.6.1.2 Initial scoping public participation process

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

I&AP identification:

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

Notification letter and Background Information Document (BID):

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

Advertisements and site notice:

Advertisements announcing the proposed project, the availability of the BID, public meetings and the I&AP registration / comment period were placed in three newspapers namely: The Namibian newspaper, Confidante newspaper and Windhoek Observer newspaper, for two consecutive weeks. Site notices were placed on the boundaries of farm fences, on the notice boards of the Regional Council and around Karibib town for public viewing. All issues raised were incorporated into the scoping report. These submissions were tabled and responded to as indicated in the public participation section of the scoping report.

1.6.1.3 Compilation and Review of Draft Scoping Report (DSR)

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

1.6.1.4 Final Scoping Report and Completion of the Scoping Phase

The Final Scoping Report (FSR) summarises the following: the legal and policy framework; approach to the EIA and process methodology; the project's need and desirability; proposed project activities; key characteristics of the receiving environment; and key issues of concern that will be further investigated and assessed in the next phase of the EIA. The FSR complies with Section 8 of the EIA Regulations 2012. All written submissions received during the DSR review and comment period will be collated and responded to. The FSR will be submitted to the competent authority. In terms of Section 32 of the Environmental Management Act, 2007 (No. 7 of 2007), the competent authority is then required to make a recommendation on the acceptance or rejection of the report to Ministry of Environment, Forestry and Tourism (MET): Department of Environmental Affairs (DEA), who will make the final decision.

1.6.2 List of Specialist Studies Undertaken

Section 9(a) of the Environmental Regulations of 2012 requires a disclosure of all the tasks to be undertaken as part of the assessment process, including any specialist to be included if necessary.

A specialist study on archaeology was undertaken by a qualified archaeologist. As part of the study, a foot survey was undertaken to identify any potential artefacts or human remains which may occur in the area. The archaeological specialist study, together with the consent letter from the Heritage Council of Namibia, is annexed to this report.

1.7 Need and Desirability

1.7.1 Need of the Mining Project

Mining is very important to Namibia and her people in terms of employment, wealth creation. Annually, the mining industry pays over N\$ 505 million in mining royalties, and N\$ 2 million in for licence and export duties, excluding value added tax and pay as you earn. The mining industry contributes over N\$300 million dollars to Government revenue annually and around N\$ 2.2 billion annually to the national economy.

The mining project may assist in helping Namibia attain some of the goals set out in National Development Plans such as the Fifth National Development Plan (NDP5) and the Harambee Prosperity Plan (HPP). During the mining phase, the project will provide employment to at least 300 people from the surrounding towns and settlements. A mine can significantly contribute to social-economic development around the surrounding community.

1.7.2. Positive Impacts of the proposed project

1.7.2.1. Job Creation

Local recruitment will be encouraged by the proponent with a target of at least 65% locals. This operation thus contributes to the alleviation of unemployment which is severe in the country. The establishment and operation of the quarry will create both direct and indirect jobs for at least minimum 50 people. Employment on the new project will be attractive to the local workforce by virtue of the comparatively high wages offered; this will result in the local growth in the economy of Karibib constituency and surrounding areas.

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

1.7.2.2. Support to local retailers shop

Mining is the highest foreign currency earner and GDP contributor to the Namibian economy, therefore the presence of mining activities near local authorities stand to benefit the local economies from project-related purchases, for example, the retail, accommodation and recreation sectors. The proponent and his employees are encouraged to purchase or support local retailers in Karibib town unless the intended material/product to purchase is not available.

1.7.2.3. Export taxes and VAT payments

Export taxes and VAT payments contribute significantly to the national economic contribution. Thus, without these payments our government will not be able to roll out the project on infrastructure, being it water, road or electricity and also sanitation facilities nationwide. The proponent and his employees are encouraged to make these payments when applicable to support the economic growth of the country.

1.7.2.4 Supply of raw materials

Supply of raw materials and processed materials to downstream industry for economic growth. In addition to construction, dimension stone is also needed for monumental, as the raw material for sculpture and tombstones. This industry will also add local value addition for the processing of blocks (waste) that cannot be sold as complete blocks.

1.7.2 Alternatives

Desired dimension stones are by nature difficult to locate as it requires extensive prospecting for that particular quality as per market demand. Granite deposits are extensive, however the most favorable granite deposits are in rather a localized area. On the other hand, marble demand depends on color, scarcity, durability and market demand. These stones can only be mined where they exist. The proposed mining site has proved to host significant quantities of marble and granite. The proposed project is in an area dominated by dimension stone mining activities and extensive prospecting has indicated the presence of dimension stones on these properties. Since, dimension stones can only be mined where identified and their quality verified, it was not practical to select any other sites. Therefore no location alternative was considered.

1.7.2.1 Mining Method Alternatives

Marble and granite quarrying involves cutting channels on all sides of large, rectangular sections called quarry blocks. These blocks usually have an open face, and once the ends and backs of the doorstep-like ledges are channeled loose, horizontal lift holes are drilled along the bottom of the open face. These long quarry blocks are being freed from the surrounding mass, with diamond wire sawing. If more modern, effective and environmentally friendly mining methods than the preferred ones are developed, such methods will be assessed and or considered.

1.7.2.2 No-Go Alternatives

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

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

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

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

1.7.2.2 Potential Land Use Conflicts

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

2. Summary of applicable legislation

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

2.1. Constitution of the Republic of Namibia, 1990

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

2.2. Environmental Management Act of 2007

Line Ministry: Ministry of Environment, Forestry and Tourism

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

2.3. The Minerals Prospecting and Mining Act of 1992

Line Ministry: Ministry of Mines and Energy

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

2.4. Water Resources Management Act of 2013

Line Ministry: Ministry of Agriculture, Water and Land Reform

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

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

Line Ministry: Ministry of Environment, Forestry and Tourism

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

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

Line Ministry/Body: National Heritage Council

The National Heritage Act provides for the protection and conservation of places and objects of heritage significance and the registration of such places and objects; to establish a National Heritage Council; to establish a National Heritage Register; and to provide for incidental matters.

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

Line Ministry/Body: Ministry of Mines and Energy

The act regulates the importation and usage of petroleum products. The act reads as “To provide measures for the saving of petroleum products and an economy in the cost of the distribution thereof, and for the maintenance of a price thereof; for control of the furnishing of certain information regarding petroleum products; and for the rendering of services of a particular kind, or services of a particular standard; in connection with motor vehicles; for the establishment

of the National Energy Fund and for the utilization thereof; for the establishment of the National Energy Council and the functions thereof; for the imposition of levies on fuel; and to provide for matters incidental thereof’.

2.8. Forest Act, No. 12 of 2001

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

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

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

2.9. Atmospheric Pollution Prevention Ordinance 11 of 1976

Line Ministry/Body: Ministry of Health and Social Services

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

2.10. Hazardous Substance Ordinance, No. 14 of 1974

Line Ministry/Body: Ministry of Safety and Security

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

2.11. Namibian Water Corporation (Act 12 of 1997)

Line Ministry/Body: Namibian Water Corporation

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

2.12. Public and Environmental Health Act, 2015

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

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

Line Ministry/Body: Ministry of Lands and Resettlement

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

3. Description of Proposed Mining Project

3.1. Introduction

Karibib is well known for vast occurrences of marble units of the Karibib formation and Swakop group. Marble and granite are by far the most common dimension stones produced, mainly in the Karibib-Usakos area in central Namibia. The proposed project area is surrounded by historical quarries such as Ubib quarry (Farm Ubib), the Gamikaub quarry (Farm Etusis 75) and the Atlantic quarry (Farm Etusis 75). The geological survey was done in November 2016, which including lithological mapping, geological profile survey. Lithological mapping and geological profile survey were undertaken to delineate surface extent of the potential lithology. The Marble unit within the project area was found to be divided into two zones along strike; the major western portion and the minor eastern portion. The marble unit was previously drilled and some marble faces have been opened up to assess the type and quality of marble as shown in Fig. 6&7. Further drilling is planned to obtain detailed information on both the marble and granite units. Marble within the project area is compact and massive as can be seen in Fig. 8.



Figure 6: one of the hole drilled on the marble unit.



Figure 7: Marble faces opened up during the exploration phase.



Figure 8: Whitish grey marble with a crystalline sugary texture.

3.2 Quarrying method

The mining techniques will use open cast mining in the extraction of the marble and granite blocks. The blocks will be cut using a diamond wire and removed by the frontend loader for stockpiling. In choosing a method, important considerations are the kind of material, the shape and size of the geologic formation, the thickness of the overburden, the topography, the production level, the locality of the quarry and imposed restrictions by the government. For homogeneous units, the

quarrying method will be by a regular bench design with the aid of diamond-based cutting technologies. Diamond-based cutting technologies are the best methods to use these days. The following operations will be carried out:

- Undercutting by using a diamond-wire saw.
- Vertical cuts with diamond wire
- Block shaping cuts with diamond wire or drill and shear techniques.

Basically, quarrying involves cutting channels on all sides of large, rectangular sections of quarry blocks. These blocks usually have an open face, and once the ends and backs of the doorstep-like ledges are channeled loose, horizontal lift holes are drilled along the bottom of the open face. These long quarry blocks are being freed from the surrounding mass, with diamond wire sawing. The diamond saw which basically consists of an engine pulling wire cable through a system of pulley and sand return wheels. The wire is a steel cable on which diamond grit-impregnated beads are held in place by plastic spacers. The wire saw strand is threaded through intersecting vertical and horizontal holes; the wire is jointed together making a large loop which simultaneously cuts the top, bottom, and one end of the granite mass. Water is fed continuously through the narrow cuts to cool the wire. If a ledge has two open sides, the wire saw can cut the entire block free. However, the attached side must still be channeled by way of drilling or light blasting. This entire block will now be moved over with a water bag jacking plant. The big block is then cut with dressing diamond wire saws into smaller blocks of 10 – 35 tons.

3.2.1 Quarry design

The main marble unit designated quarry 1 in (figure 3) is envisaged to be the initial focal point mining or be mined concurrently with other two quarries designated quarry 2 and 3, depending on the market demand. Mining will proceed by means of a series of work faces, benches and vertical slopes (figure 9). The following is the summary of the key design aspects that has been considered and will continue to be evaluated during the mining operations:

- Expected maximum pit depth of up to 20 m;

- Bench height may be 7 m, however, the marble deposit character and geology, production strategy, slope stability and equipment set may play an important role in determining the exact height
- Bench slope dependent on the geotechnical conditions;
- Bench width based on the space required for the operation of the equipment on it;
- Haul access width and gradient linked to the operating parameters of the trucks and other hauling equipment used in the mine. It shall be wider than the bench width, and;
- Bench length linked to the production rate.

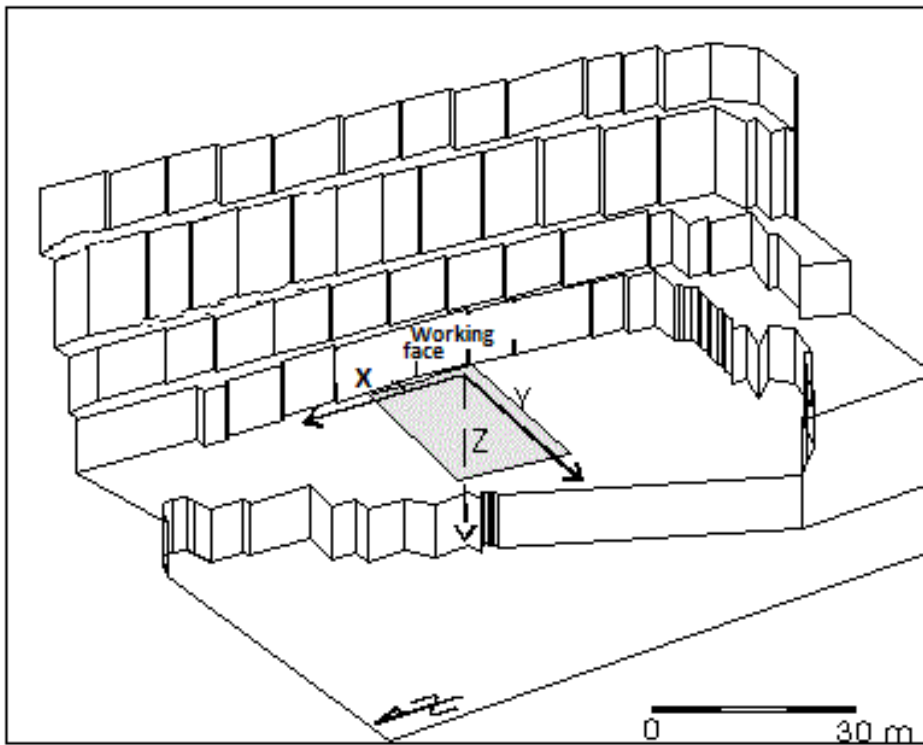


Figure 9: A graphic illustration of the quarrying method displaying working face, benches and vertical slopes.

3.2.2 Mineral processing

The smaller marble blocks will then be moved to the dressing yard. The yard is in very close proximity to the mining activities itself. While most dimension stone mine merely “rough-dress” the cut block by jack hammer trimming, the produced at this mining area will mostly be diamond wire dressed. A derrick boom is slowly raised, tightening the hooks in their holes and the block

is lifted from the quarry to be placed on a waiting truck for transporting to the dressing yard. After final dressing and quality control these dimensioned saw blocks are removed by mobile crane onto trucks and shipped to monument plants for processing.

3.2.3 Quarry Residue and rehabilitation

The only noticeable mine residue will be the “waste” material not usable. This material can be used for rehabilitation purposes during decommissioning. The overburden removed during the opencast operation will be used to fill the excavations during rehabilitation with the result that on completion of mining no waste dumps will remain.

3.3 Labour requirements

The proponent intends to employ more than 50 personnel, including 6 management staff for the first phase of the project. The employees will be sourced from the local community. All employees will undergo a safety induction, first aid training course and wildlife awareness program. The Labour Act of 2007 will always be adhered to.

3.4 Waste Dumps

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

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

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

4 Description of the current environment

4.1 Introduction

This section aims to document the present state of the environment, the likely impact of changes being planned and the regular monitoring to attempt to detect changes in the environment. As such, this area represents high fauna diversity. Namibia has four very large and arid regions which set them apart in various ways from the rest of the country; Kunene and Erongo region in the west and Karas and Erongo in the south (Mendelsohn, et al., 2002). Kunene Region occupies the northwest corner of Namibia. The Skeleton Coast Park forms its entire western boundary with the Atlantic Ocean. The Kunene River with its Epupa Falls forms an international boundary with Angola to the north. Nationally, Kunene is bordered by Omusati Region and the western boundary of Etosha National Park. In the south it forms the southern boundary of most of Etosha National Park and borders Erongo and Erongo regions. The region is home to the Skeleton Coast Park and many conservancies. Erongo is one of the central regions in Namibia with a size of 105,185 square kilometers, with vegetation ranging from open savanna around Karibib, to lush vegetation and massive bright red sandstone cliffs. There is generally an absence of fences in most parts of the Erongo Region. This makes livestock farming easier which means that both wild and domestic animals can move widely in many places, migrating from areas of poor grazing to other places with more abundant pastures.

4.1.1 Current Land Uses

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

4.2 Climatic Conditions

4.2.1 Temperature

The project is located in an arid to semi-arid region. Approximately half of the Karibib district where project is situated is covered by dry land grasses and the other half by dry land scrub. The coldest temperatures are typically encountered between June and August, ranging from 7 – 10°C. The highest temperatures are reported between late October and early February. During this time, peak average temperatures reach up to 32°C (generally in mid-November).

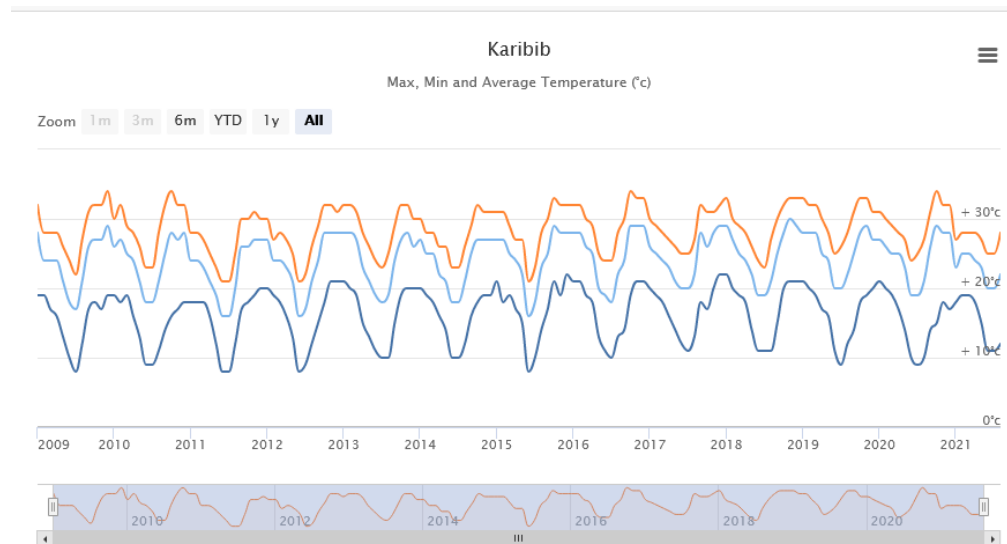


Figure 10: Temperature graph for Karibib (worldweatheronline, 2021).

4.2.2 Precipitation

The highest precipitation in the area occurs between January to March, with a maximum precipitation of 150 mm occurring in the month of February. In January months, rainfall may reach about 150 mm with average rainfall days. The graph below shows the rainfall patterns in the proposed project area. The area experiences semi-arid climatic conditions with an average rainfall of 211 mm per annum. Annual average potential evaporation rate far exceeds average annual rainfall and net water deficit conditions prevail.

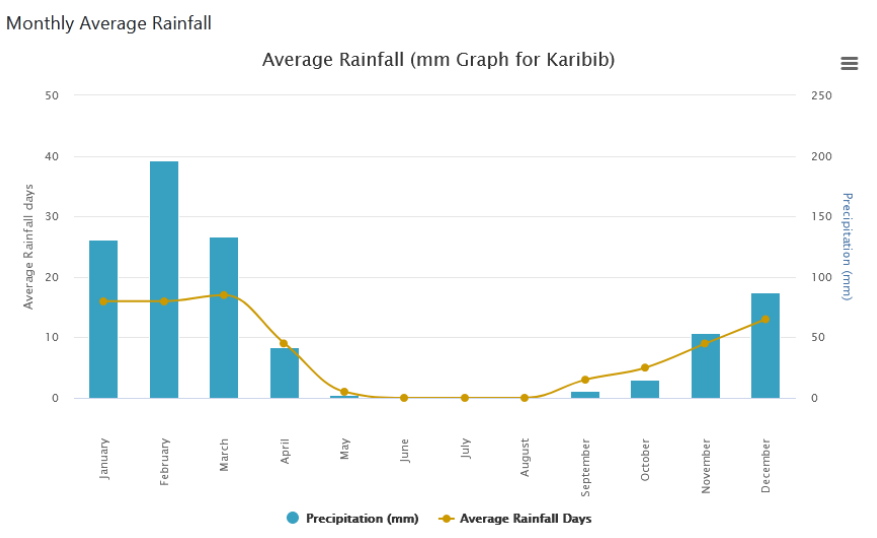
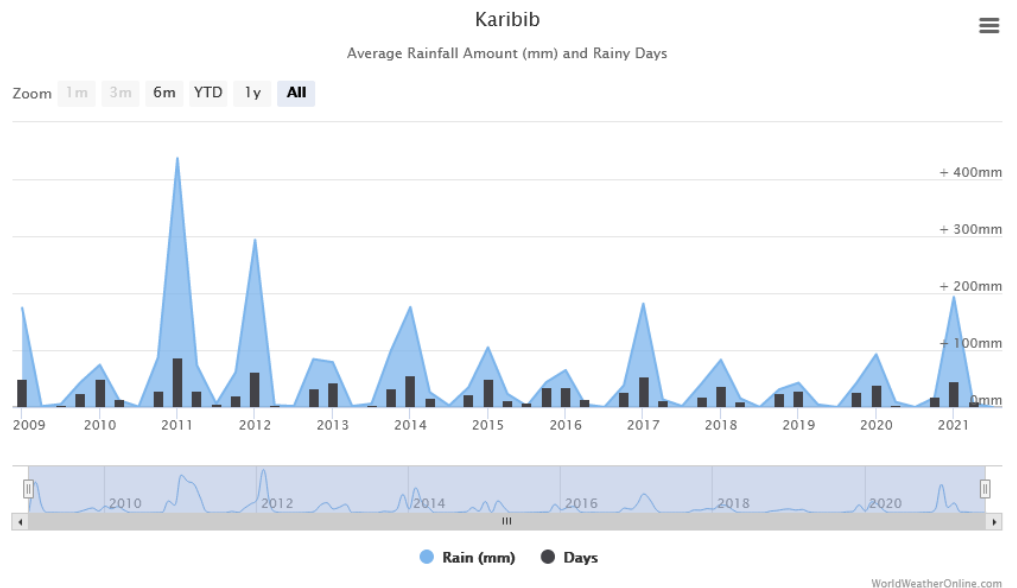


Figure11: Rainfall graph for Karibib (worldweatheronline, 2021).

4.2.3 Wind

Karibib area is subject to erratic winds and considerable discrepancies in spite of short distances, due to the hilly terrain. Predominantly south easterly, southerly, easterly and northerly airflow is common .The graph below depicts the wind patterns in the area. The highest wind speeds are attained in October as shown by the graph below.

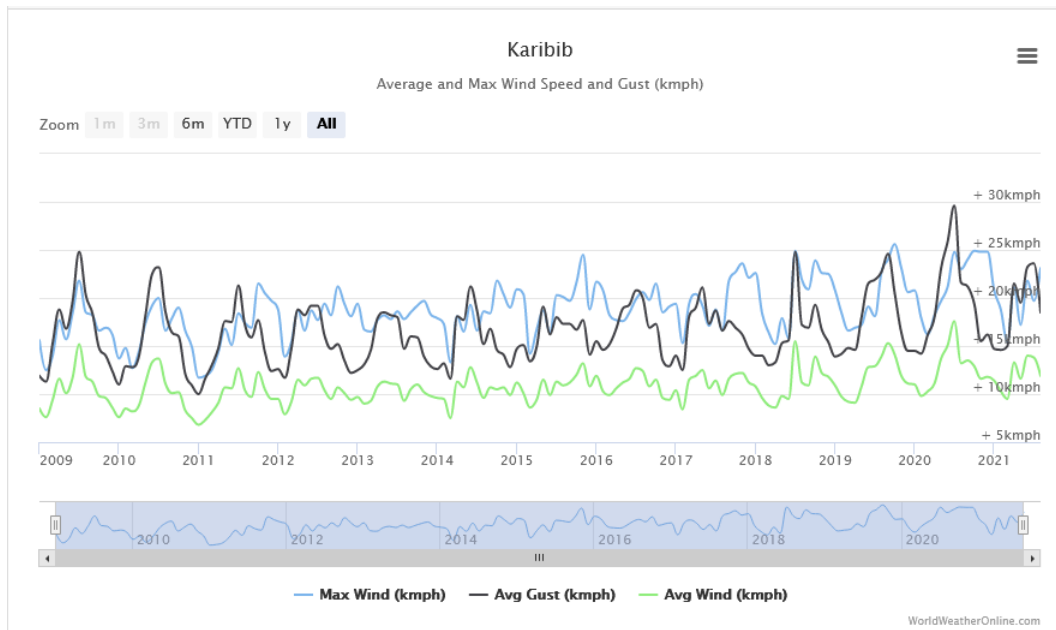


Figure 12: Wind graph for Karibib showing maximum, average gust and average wind (worldweatheronline, 2021).

4.2.4 Humidity

The relative humidity during the least humid months of the year, i.e. October and September, is around 20 % and the most humid month is February with 45% humidity. Namibia has a low humidity in general, and the lack of moisture in the air has a major impact on its climate by reducing cloud cover and rain and increases the rate of evaporation.

4.3 Air Quality

Data from accuweather.com shows that the air quality in the area is generally excellent with an air quality index of 16 AQI. The ground-level ozone (O₃) is about 16 µg/m³ which is excellent. The fine particle matter levels (PM 2.5) are about 6 µg/m³. The particle matter (PM10) is about 4 µg/m³. The nitrogen dioxide (NO₂), carbon monoxide (CO), and Sulphur dioxide (SO₂) levels in the area are recorded to be 0 µg/m³. Probable sources of air pollution in the area are emissions and dust from vehicles travelling on gravel roads, dust generated by cattle grazing and wind erosion from the exposed areas.

4.4 Geology

4.4.1 Regional geology

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

The central zone of the Damara Belt is a high-temperature, low-pressure zone with metamorphic grade increasing from middle amphibolite facies in its eastern parts to lower granulite facies in its western parts (Miller, 2008). The northern (nCZ) and southern central (sCZ) zones are separated by the Omaruru lineament to the west and the Waterberg fault in the east. In terms of lithology, the central zone is characterized by mainly schist, marble and quartzite of the Swakop and Nosib groups of the Damara sequence with numerous syn- to post-tectonic granitic plutons (Fig. 9). The zone is also typified by major magnetic lineaments (Welwitschia and Erongo) and minor magnetic lineaments (Abbabis and Otjikoto). Peak regional metamorphism in the central zone (CZ) is syn-D₂ and occurred at ~520 Ma (Haack *et al.*, 1980; Miller, 1983). On the other hand Miller (2008) places the peak of post-tectonic M₂ regional metamorphism throughout the Damara belt at 535 Ma.

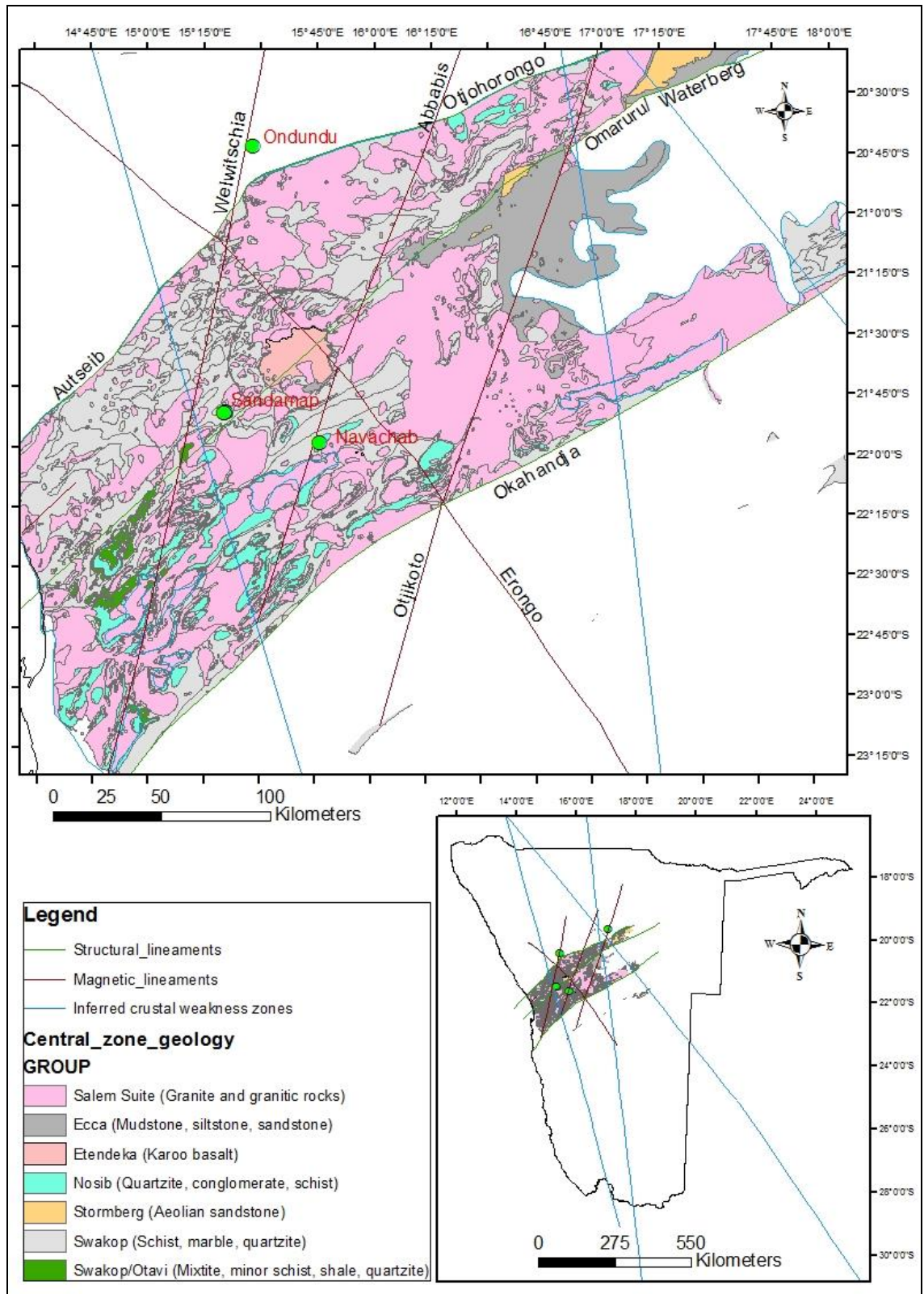


Figure 13: Geology and structural lineaments of the central zone of the Damara orogenic belt.

4.4.2 Stratigraphy

The ML application area falls within the Central Zone of the Damara Sequence. The oldest rocks within the Central Zone are the pre-Damaran basement (Nosib Group) was deposited laid down in or marginal to intracontinental rifts, consists of gneiss, quartzite, arkose, conglomerate, phyllite, calc-silicate, subordinate, limestone and evaporitic rocks. The sequence was deposited during successive phases of rifting, spreading, subduction and continental collision (Miller, 2008). Much of the basal succession (Nosib Group), The Karibib formation which hosts the targeted marble overlies the Arandis Formation and underlies the Kuiseb Formation (Table 1). The partial stratigraphy of the Central zone as in Miller (2008) as given is given in Table 1.

Table 1: Partial Litho stratigraphy of the Damara Sequence in Central Namibia (after Miller, 2008).

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

4.4.2 Local Geology

The application area is characterised by the presence of non-foliated porphyritic biotite granite of the Cambrian age which intruded into the mica schist of the Arandis Formation and marble of the Karibib Formation (Figure 14). Southerly, Marble of the Karibib Formation is in contact with mica schist of the Kuiseb Formation which further south east ward share a contact with foliated diorite of the Namibian age. The Karibib Formation which belongs to the Navachab Subgroup of the Swakop Group is represented mainly by marble, dolostone and limestone. The Swakop Group belongs to the Damaran Supergroup. The second targeted commodity; the non-foliated porphyritic biotite granite is one of the Damaran intrusive of the Cambrian age. The lithology envisaged for dimension stone quarrying are the Marble of the Karibib Formation and the non-foliated biotite granite. The marble which is composed of calcite and dolomite vary from light banded brown yellow / white to white/grey, light green bands and patches.

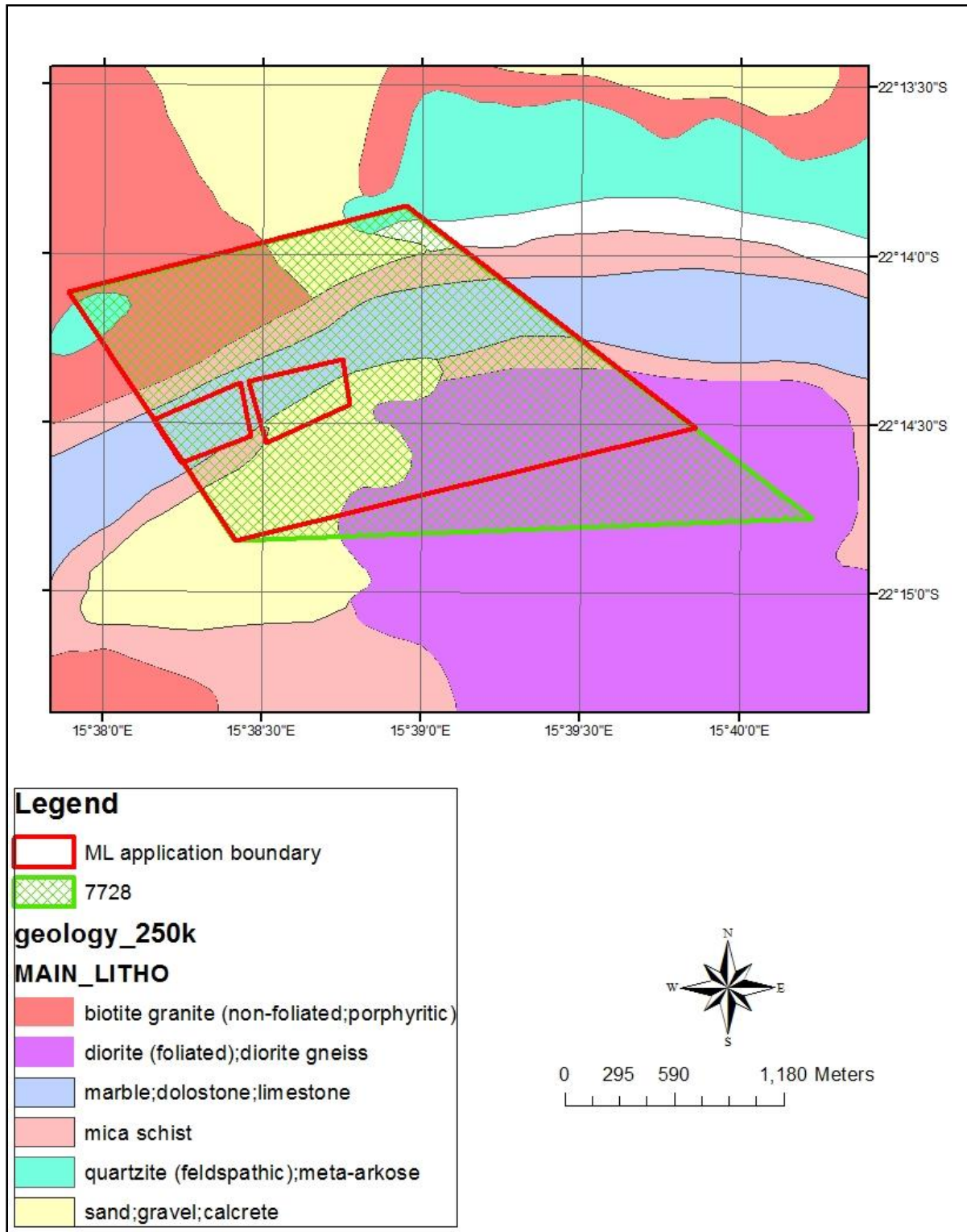


Figure14: Detailed local geology of the proposed ML area.

4.5 Hydrogeology and hydrology

The project area is located in the Omaruru-Swakop River basin, which stretches over the Khomas, Erongo and Otjozondjupa Regions. Moreover, the area is underlain by a moderately productive but variable (porous or fractured) aquifer. There are no river systems passing through the project area. Permission for borehole drilling, groundwater abstraction will be obtained from the Ministry of Agriculture, Water and Land Reform (MAWLR) shall the need for groundwater uses arise. Groundwater in the area is associated with the good secondary hydraulic properties of the limited surficial covers and extensive carbonate deposits.

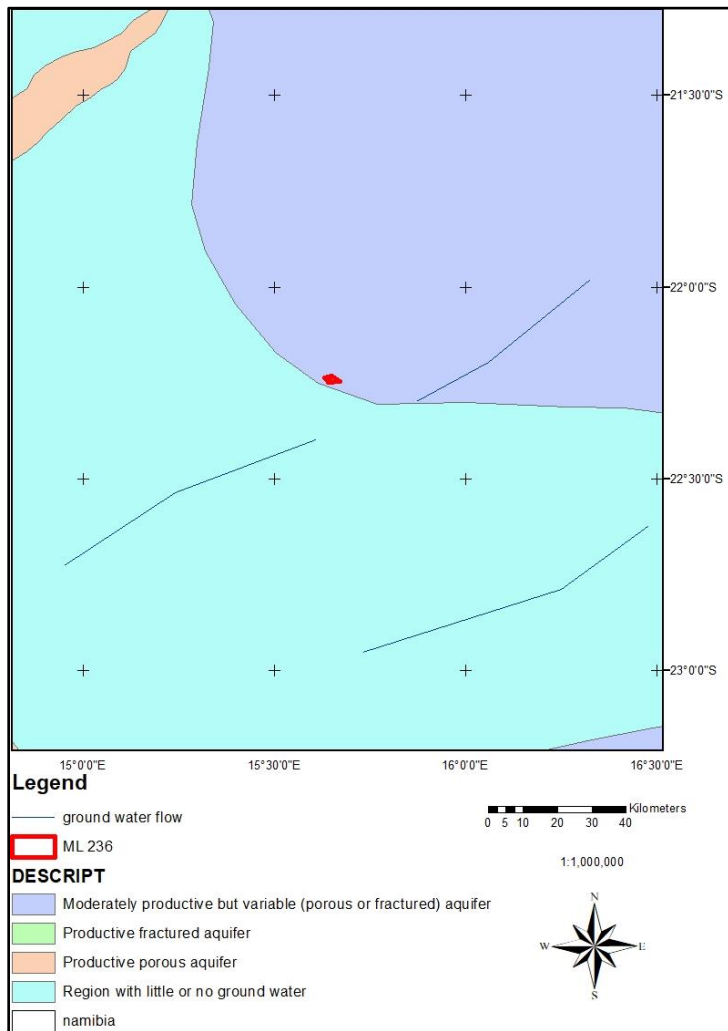


Figure 15: Hydrogeological Map of the project area

4.6 Fauna and flora

Introduction

The impact of the proposed development on fauna and flora was carried out during the site visits conducted in July 2021. A thorough assessment was carried out within the mining licence area (ML236) by means of field observations, recording and data collecting. Some of the information is based on a detailed literature review. The purpose of the Fauna literature review is to identify all potential amphibians, reptiles, and mammals expected on the project area and the surrounding farms in the vicinity of the mining area. The proposed mining area supports numerous faunal species but there are no species that are exclusive to the study area.

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

4.6.1 Flora

The EPL 7728 area falls within the Semi-desert and Savanna Transition Zone vegetation type. In form, vegetation is generally sparse, with few trees and a thin variety of grass. Plant cover varies in relation to rainfall and so the eastern parts of Erongo have more grass and trees than the Western, coastal areas (Christian, 2005). Rainfall in the Erongo Region is usually both low and extremely variable which means that years of abundant rain often followed by extreme dry conditions (Mendelsohn, et al., 2002). Karibib area is viewed as an area of importance for local endemic plant species and high botanical diversity. Erongo Mountains has between 26-35 endemic species (Mendelsohn *et al.* 2002). The overall plant production is classified as medium to low in the general Karibib area. Bush thickening /encroachment is viewed as problematic between Karibib

and Omaruru with *Acacia reficiens* being the problem species. The density of vegetation in the vicinity of the mining site is sparse.



Figure 16: Sparse vegetation around the marble outcrops.

Based on the literature review, all the vegetation that are found within the vicinity of the area are of “medium” to “high” sensitivity against external conditions. Every effort will be made to protect the existing trees and shrubs, as these are very important to the ambience and visual appeal of the mining site. A vegetation expert will be consulted throughout the lifecycle of the mining program. The protected plant species in the project area are shown in the table below.

Table 2: lists the different plant species which are most likely to occur within the project area. Plant species highlighted in orange are protected under the Forestry Act.

Scientific name	Local name	Status in Namibia
<i>Acacia erioloba</i>	Camel thorn	Protected
<i>Acacia mellifera</i>	Black thorn	Secure

<i>Acacia reficiens</i>	False umbrella thorn	Secure
<i>Acacia haematoxylon Grey</i>	Grey camel thorn	Protected
<i>Acacia erubescens</i>	Blue thorn	Secure
<i>Acacia karroo</i>	Sweet thorn	Secure
<i>Acacia tortolis</i>	Umbrella thorn	Secure
<i>Acacia hereroensis</i>	False hook-thorn	Secure
<i>Commiphora tenuipetiolata</i>	White-stem corkwood	Secure
<i>Aloe littoralis</i>		Protected
<i>Ozoroa crassinervia</i>	Namibian resin tree Near	endemic, protected
<i>Boscia albitrunca</i>	Shepherd's tree	Protected
<i>Albizia anthelmintica</i>	Worm-bark false-thorn	Protected
<i>Ziziphus mucronata</i>	Buffalo-thorn	Protected
<i>Catophractes alexandri</i>	Trumpet thorn	Secure
<i>Combretum apiculatum</i>	Red bush willow	Secure
<i>Commiphoradinteri</i>		Endemic
<i>Commiphora glandulosa</i>	Tall common corkwood	Secure
<i>Commiphora glaucescens</i>	Blue-leaved corkwood	Near endemic
<i>Croton gratissimus</i>	Lavender fever-berry	Secure
<i>Cyphostemma bainesii</i>		Endemic, protected
<i>Dichrostachy scinerea</i>	Sickle bush	Secure
<i>Diospyroslycioides</i>	Blue bush	Secure
<i>Dombeya rotundifolia</i>	Common wild pear	Endemic
<i>Ehretia alba</i>		Secure
<i>Elephantorrhiza suffruticosa</i>		Secure
<i>Euclea pseudebenus</i>	Ebony tree	Protected
<i>Euclea undulata</i>	Common guarri	Secure
<i>Euphorbia guerichiana</i>	Western woody milk bush	Secure

<i>Euphorbia virosa</i>		Secure
<i>Ficus cordata</i>	Namaqua fig	Protected
<i>Ficus ilicina</i>	Laurel fig	Secure
<i>Ficus scomorus</i>	Common cluster fig	Protected
<i>Grewia bicolor</i>	White raisin	Secure
<i>Grewia flava</i>	Velvet raisin	Secure
<i>Grewia flavescens</i>	Sand paper raisin	Secure
<i>Gymnosporia senegalensis</i>	Red spike-thorn	Secure
<i>Ipomoea adenioides</i>		Secure
<i>Lycium bosciifolium</i>		Secure
<i>Lycium cinereum</i>		Secure
<i>Lycium eenii</i>		Secure
<i>Lycium hirsutum</i>		Secure
<i>Lycium villosum</i>		Secure
<i>Maerua juncea</i>		Secure
<i>Maerua schinzii</i>	Ringwood tree	Protected
<i>Manuleopsis dinteri</i>		Endemic
<i>Melianthus comosus</i>		Secure
<i>Obetia carruthersiana</i>		Near endemic
<i>Pechuel-Loeschea leubnitziae</i>		Secure
<i>Ozoroa crassinervia</i>	Namibian resin tree	Protected
<i>Sterculia africana</i>	African star-chestnut	Protected
<i>Tarchonanthus camiphoratus</i>		Secure
<i>Tetragoniaschenckii</i>		Secure
<i>Vernonia cinerascens</i>		Secure
<i>Searsia (Rhus) ciliata</i>		Secure
<i>Searsia (Rhus) lancea</i>	Karree	Protected

<i>Searsia (Rhus) marlothii</i>		Secure
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Figure 17: *Boscia Albitrunca* (Shepherd's tree) one of the protected species on the proposed project site.

4.6.1.1 Alien Plants

The alien plants were taken into consideration during the botanical assessment. It was found that there are no alien plants in the proposed area and its immediate surrounding area.

4.6.2 Fauna

4.6.2.1 Mammals

Based on the literature review, there are generally about 68 species of mammals expected to occur within the immediate area. There are generally 25 species which rarely occur, 2 species that occur seasonally, 4 that occur occasionally, and 33 that occur abundantly within the project area. Considering the relative size of the mining area, the mammal fauna will not be affected by the mining activities of the proponent. Namibia is seemingly well endowed with mammal diversity with around 250 species known to be present within the country (Griffin, 1998). There are currently 14 mammal species which are considered to be endemic to Namibia, including 11 species of rodents and small carnivores which are not well known. Griffin (1998), points out that most of

these endemic mammals are associated with the Namib and Escarpment with 60% of these appearing to be rock-dwelling species. The author, Griffin (1998) further highlights that the endemic mammal fauna is best characterized by the endemic rodent family *Petromuridae* (Dassie rat) and the rodent genera *Gerbillurus* and *Petromyscus*.

The table below shows the mammal species which are likely to occur within the study area. A full list, of mammal species that are likely to occur within the area, is in the appendix section at the end.

Table 3: Mammal species which are likely to occur within the project area.

Scientific name	Common name
<i>Acinonyx jubatus</i>	Cheetah
<i>Antidorcas marsupialis</i>	Springbok
<i>Atelerix frontalis angolae</i>	Southern African Hedgehog
<i>Canis mesomelas</i>	Black-backed Jackal
<i>Caracal caracal</i>	Caracal
<i>Crocuta crocuta</i>	Spotted Hyena
<i>Cynictis penicillata</i>	Yellow Mongoose
<i>Equus zebra hartmannae</i>	Hartmann's Mountain Zebra
<i>Felis nigripes</i>	Black-footed Cat
<i>Felis silvestris/lybica</i>	African Wild Cat
<i>Galerella sanguinea</i>	Slender Mongoose
<i>Genetta genetta</i>	Small Spotted Genet
<i>Ictonyx striatus</i>	Striped Polecat
<i>Lepus capensis</i>	Cape Hare
<i>Lepus saxatilis</i>	Scrub Hare
<i>Manis temminckii</i>	Ground Pangolin
<i>Mellivorca capensis</i>	Honey Badger
<i>Oreotragus oreotragus</i>	Klipspringer
<i>Oryx gazella</i>	Gemsbok
<i>Otocyon megalotis</i>	Bat-eared Fox
<i>Panthera pardus</i>	Leopard
<i>Parahyaena (Hyaena) brunnea</i>	Brown Hyena
<i>Phacochoerus africanus</i>	Common Warthog
<i>Proteles cristatus</i>	Aardwolf
<i>Raphicerus campestris</i>	Steenbok
<i>Suricata suricatta marjoriae</i>	Suricate
<i>Sylvicapra grimmia</i>	Common Duiker
<i>Tragelaphus strepsiceros</i>	Greater Kudu
<i>Vulpes chama</i>	Cape Fox

4.6.2.2 Reptiles

The literature review showed that there are approximately 60 reptile species that are expected to occur in the site area. According to the Namibia Conservation Ordinance of 1975, there are four reptile species protected, namely:

Table 4: Protected reptile species in the project area

Scientific name	Common name	Status
<i>Psammobates Oculiferus</i>	Kalahari Tent Tortoise	Protected
<i>Geochelone Pardalis</i>	Leopard Tortoise	Protected
<i>Python Natalis</i>	Southern African Python	Protected
<i>Varanus Albigularis</i>	Veld Leguaan	Protected

Griffin (1998) highlighted the presence of 261 species of reptiles which are present in Namibia. These reptiles make up 30% of the reptile species found on the continent. 55 species of Namibian Lizards are classified as endemic (Griffin, 1998). The author, Griffin (1998), describes that more than 60% of the reptiles found in Namibia are protected by the conservation Ordinance. Although mining activities do affect reptile habitat, the project will not have any significant impact on the reptile species within the proposed mining area. Namibia, with 129 species of lizards, has one of the continent's richest lizard Fauna. The table in the appendix shows the reptile species which are likely to occur within the vicinity of the mining area.

4.6.2.3 Avifauna (Birds)

Simmons et al (2003) points that although Namibia's Avifauna is comparatively sparse compared to the high rainfall equatorial areas elsewhere in Africa, approximately 658 species have already been recorded with a diverse unique group of arid endemics. There are approximately 650 species of birds that have been recorded in Namibia, although the country's avifauna is comparatively sparse compared to the high rainfall equatorial areas in Africa (Brown & Lawson, 1989). Brown et al (1989) mentions that 14 species of birds are endemic or near endemic to Namibia with the majority of Namibian endemics occurring in the Savannah of which ten species occur in a north-south belt of dry Savannah in Central Namibia. Simmons (2003) recorded 63 species of birds within the vicinity of the project area. 650 bird species are recorded in Namibia, of which 160 species are present in area, especially after good rains fall (Christian, 2005). These birds consist of

raptors, chats, larks and karoid species. Christian (2005) recorded the presence of the following bird species in the vicinity of the area, which include:

Table 5: Bird species which are likely to occur within the site area.

Scientific name	Common name
<i>Tockus monteiri</i>	Monteiro's Hornbill
<i>Agapornis roseicollis</i>	Rosy-faced Lovebird
<i>Eupodotis rueppellii</i>	Rüppell's Korhaan
<i>Lanioturdus torquatus</i>	White-tailed Shrike
<i>Parus carpi</i>	Carp's Tit
<i>Phoeniculus damarensis</i>	Violet Wood-Hoopoe
<i>Poicephalus rueppellii</i>	Rüppell's Parrot
<i>Pternistishartlaubi</i>	Hartlaub's Spurfowl
<i>Tockus damarensis</i>	Damara Hornbil

4.6.2.4 Amphibians

Based on the literature review, there are generally 14 types of amphibian species that occur in project area. Nine of these amphibian species occur abundantly, two occur rarely and six of them occur uncommonly. Griffin (1998) highlighted that amphibian species are declining throughout the world due to various factors such as climate change and habitat destruction. There are approximately 4000 species of amphibians worldwide of which over 200 species are present in Southern Africa and 57 in Namibia (Griffin, 1998). However, this low figure may be due to the lack of detailed studies carried out on amphibians. The table below shows the different amphibian species that are likely to occur within the study area.

Table 6: A list of amphibian species which may occur in the project area.

Scientific name	Common name	Status	Occurrence
Sand frogs, Bull frogs, Ridged frogs, Cacos, Puddle frogs			
<i>Cacosternumboettgeri</i>	Common caco	Secure	Abundant
<i>Hildebrandtiaornata</i>	Ornate frog	Secure	Uncommon
<i>Phrynobatrachusmababiensis</i>	Mababe puddle frog	Secure	Uncommon
<i>Phrynobatrachusnatalensis</i>	Snoring puddle frog	Secure	Uncommon
<i>Pyxicephalusadpersus</i>	Giant bullfrog	Secure	Abundant
<i>Tomopternakrugerensis</i>	Knocking sand frog	Secure	Rare
<i>Tomopternatandyi</i>	Tandy's sand frog	Secure	Abundant
Fossorial Frogs			
<i>Phrynomantisaffinis</i>	Spotted rubber frog	Ambiguous	Rare
<i>Phrynomantisbifasciatus</i>	Banded rubber frog	Secure	Abundant
Toads			
<i>Breviceps adpersus</i>	Bushveld rain frog	Secure	Abundant
<i>Bufo dombensis</i>	Dombe dwarf toad	Endemic	Abundant
<i>Bufo poweri</i>	Mottled toad	Secure	Abundant
Platannas			
<i>Xenopus laevis</i>	Common Platanna	Secure	Abundant
TREE FROGS, REED FROGS & KASSINAS			
<i>Kassina senegalensis</i>	Bubbling Kassina	Secure	Abundant

4.7 Archaeology and Heritage Sites

There are no declared heritage sites by the National Heritage Council of Namibia on ML236 and EPL7728. Accidental find procedure at the subject site may be required. A separate heritage impact assessment is annexed to this report

4.8 Socio-Economic Environment

4.8.1 Demographics of Karibib

The proposed project site is located 45km South East of Karibib town. Karibib is a town in Erongo Region, It has 3,800 inhabitants and owns 97 square kilometers of town land. Karibib is the district capital of the Karibib electoral constituency. It is situated on the Khan River, halfway between Windhoek and Swakopmund on the B2 (Trans-Kalahari Highway), the main road between the Walvis Bay and Johannesburg. The town is known for its aragonite marble quarries and the Navachab Gold Mine. Karibib is connected to the Trans Namib railway network; Karibib Railway Station is situated downtown. The next station to the west is Kranzberg, the junction for the branch railways to Tsumeb and Grootfontein from the line to the capital Windhoek. North of the town is the location of the headquarters of the Namibian Air Force at the Karibib Air Base, housing the Command of the Air Force. The air base has a 2,600 meters asphalt runway, parallel paved taxiways and apron. Karibib was downgraded from municipal to town status in 2010. It is now governed by a town council that has seven seats.

4.8.2 Employment within the Erongo Region and Karibib town

The Navachab gold mine located about 10km from Karibib town is the major tax payer, employer and property owner of the town providing more than 750 jobs and owning 240 residential plots. Farming is the second main source of income in this town, while other people operate their own businesses. Small scale mining, have created additional jobs for the inhabitants of this town. About 70% of the Erongo Region population is employed while 30% are unemployed. The inactive group, which consists of homemakers, 11%, students 46% and the severely disabled, retired or old age income recipients 35% makes up of the regions' population.

4.8.3 Social Economic Impact

The project has great potential to improve livelihoods and contribute to sustainable development within the surrounding community. With the potential employment of 50 people during the initial phase, the number is expected to increase as the project moves to an advance stage of quarrying. Community meetings will be held from time to time by the proponent wherever possible, with the purpose of effectively communicating with the local community and to avoid any unexpected social impacts.

5. Assessment of Impacts

Introduction

The impact assessment methodology used to determine the significance of impacts prior and after mitigation is presented below. The assessment process was describe how the significance, probability, and duration of the aforesaid identified impacts that were identified through the consultation process, desktop studies of dimension stone mining in the Erongo Region by reviewing previous EIA's and EMP's. The phases covered by this assessment are: construction, operational and closure/decommissioning phase. The environmental assessment section of the scoping report and the consequent EMP shall also be compartmentalized into these phases. This assessment methodology enables the assessment of cumulative impacts, the significance of impacts, the extent of the impacts, the duration and reversibility of impacts, the probability of the impact occurring and the degree to which the impacts can be mitigated.

Methodology used in determining the significance of environmental impacts

Table 7: Impact assessment criteria

Criteria	Description			
Extent	National (N): The whole country.	Regional (R): Erongo Region.	Local (L): within 2km radius of the quarrying area)	Site (S): within the quarrying area.
Duration	Permanent (P): mitigation either by man or natural process will not occur in such a way or in a timeframe that the impact can be considered short lived.	Long term (LT): the impact will last for the entire operation life of the mine, but will be mitigated by natural or human action.	Medium term (MT): the impact will last for the period of the construction phase.	Short term (ST): the impact will either disappear with mitigation or will be mitigated through natural process in a span shorter than the

				construction phase.
Intensity	Very high (VH): Natural, cultural and social functions and processes are altered to the extent that they permanently cease.	High (H): Natural, cultural, and social functions and processes are altered to the extent that they temporarily cease.	Moderate (M): affected environment is altered but, natural, cultural and social functions and processes continue albeit in a modified way.	Low (L): Impact affects the environment in such a way that natural, cultural and social functions and processes are not affected.
Probability	Definite (D): Impact will certainly occur.	Highly probable (HP): Most likely that the impact will occur	Possible (P): The impact might occur.	Improbable (I): Low likelihood of the impact occurring.
Significance	Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. Significance is given before and after mitigation.			
Status of the impact	A statement of whether the impact is <ul style="list-style-type: none"> • Positive(beneficial impact) • Negative (adverse impact) • Neutral impact (neither beneficial nor adverse) 			

The **severity rating** is calculated from the factors given to intensity and **duration**. Intensity and duration factors are awarded to each impact, as described below.

The **Intensity factor** is awarded to each impact according to the following method:

➤ Low intensity	Nature and/or man made functions not affected and a minor impact may occur. <i>Factor 1</i>
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➤ Moderate intensity	Environment affected but natural functions and processes can continue though often in a slightly altered manner. <i>Factor 2</i>
➤ High intensity	Environment affected to the extent that natural functions are altered to the extent that it will temporarily or permanently cease. <i>Factor 4</i>

Duration is assessed and a factor awarded in accordance with the following:	
Short term	≤ 1 to 5 years <i>Factor 2</i>
Moderate term	5 to 15 years <i>Factor 3</i>
Long term	Impact will only cease after the operational life of the activity, either because of natural process or by human intervention. <i>Factor 4</i>
Permanent	Mitigation, either by natural process or by human intervention, will not occur in such a way or in such a time span that the impact can be considered transient. <i>Factor 5</i>

The Severity factor is the product of Intensity factor and Duration factor	
Severity Ratings	Factor
Low Severity (Rating 2)	Calculated values 2 to 4
Moderate Severity (Rating 3)	Calculated values 5 to 8
High Severity (Rating 4)	Calculated values 9 to 12
Very High Severity (Rating 5)	Calculated values 13 to 16 and more
Severity factors below 3 indicate no impact	

Table 8: Criteria for significance ratings and associated range of scores.

<p>A Significance Rating is calculated by multiplying the Severity Rating with the Probability Rating: The significance rating should influence the development project as described below:</p>	
<p>Low significance (calculated Significance Rating 4 to 6)</p>	<ul style="list-style-type: none"> • Positive impact and negative impacts of low significance should have no influence on the proposed development project
<p>Moderate significance (calculated Significance Rating ≥ 7 to 12)</p>	<ul style="list-style-type: none"> • Positive impact: Should indicate that the proposed project should be approved • Negative impact: Should be mitigated or mitigation measures should be formulated before the proposed project can be approved
<p>High significance (calculated Significance Rating ≥ 13 to 18)</p>	<ul style="list-style-type: none"> • Positive impact: Should points towards a decision for the project to be approved and should be enhanced in final design. • Negative impact: Should weigh towards a decision to terminate proposal, or mitigation should be formulated and performed to reduce significance to at least low significance rating.
<p>Very High significance (calculated Significance Rating ≥ 19 to 25 and more)</p>	

Mitigation measures

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

Monitoring

Monitoring requirements with quantifiable standards to assess the effectiveness of mitigation actions have been recommended where appropriate. These must indicate what actions are required,

by whom, and the timing and frequency thereof. If further investigations must be undertaken and monitoring programmes implemented before, during and after operations.

5.1. Socio-economic benefits and issues

5.1.1. Socio-economic benefits

The proposed dimension stone mine is expected to bring upliftment of the Karibib town. The impact will have a positive impact on the local GDP. Job opportunities for the local communities will be created. It is estimated that during the project construction phase, 50 potential employment opportunities will be open. The project has great potential to improve livelihoods and contribute to sustainable development within the surrounding community. As a result of construction of the quarry, buildings and other mineral related infrastructure, supply chain opportunities will be created that could benefit local suppliers community meetings will be held from time to time by the proponent wherever possible, with the purpose of effectively communicating with the local community and to avoid any unexpected social impacts.

5.1.1.1. Potential Direct Benefits

Direct capital investment: The quarrying project will require a significant capital investment of at least N\$ 40 million. This will be used for purchasing machinery required for the project.

Stimulation of skills transfer: Due to the nature of quarrying operations, the proponent will implement ad-hoc training programme for some of its staff members. Training programmes will be well structured and staff members will permanently benefit from these training programmes.

Job creation: With the potential employment of 50 people, this means that 50 families will benefit from the project during the on-going phase. The project has a great potential to improve livelihoods and contribute to sustainable development within the surrounding community.

5.1.1.2. Potential Indirect Benefits

- The data generated from the quarrying activities will be made available to the Ministry of Mines and Energy for future research purposes.
- General enhancement of the health conditions and quality of life for a few people in the surrounding settlements.

- Of significance is the prospect of diversification of the surrounding economy, which is presently mainly focused on farming, tourism and small-scale mining of semi-precious stones.

5.1.1.3. General socio-economic concerns

Notwithstanding the above benefits there are a few concerns that could reduce or counteract the above benefits related to the project, as follows:

- As the movement of staff and contractors to and from the area increases, the risk of spread of HIV/AIDS and other STDs increases;
- Increased influx of jobseekers to the area as people come in search of job opportunities during the operational phase of the quarrying project. This could lead to potential increase in the unemployed people in the area and the establishment/growth in informal settlements which could exacerbate security issues due to increased crime rates.
- Impacts on the size and structure of the population. Increased informal settlement and associated problems;
- Negative impact on the health and safety of the surrounding community and workers.

Table 9: Impact evaluation for socio-economy

Impact	Duration	Extend	Intensity	Probability
Increased influx of jobseekers.	MT	N	M	LP
Increased spread of HIV/AIDS and other STDs.	ST	L	L	P
Impacts on the size and structure of the population.	MT	L	L	LP
Negative impact on the health and safety of the surrounding community and workers.	ST	L	L	LP

5.2. Identified impacts on bio-physical environment

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

5.2.1. Air quality

The proposed quarrying activities are the potential of fugitive sources for the dust particles as they are easily dispersed and carried away by the winds. During the operation phase dust will be generated onsite by earth moving equipment and also on the gravel road by trucks and vehicles. Continuous movements of people, vehicles and earth moving vehicles on site can thus loosen and re-suspend the deposited material again into the air. As part of the operation routine, marble blocks will be cut into smaller blocks in order to give them the desired smooth shape. During the cutting process about a quota of the original marble mass is lost in the form of dust.

Moreover, vehicle exhausts contain a number of pollutants including carbon dioxide (CO₂), carbon monoxide (CO), hydrocarbons, oxides of nitrogen (NO_x), Sulphur and PM10. Tiny amounts of poisonous trace elements such as lead, cadmium and nickel are also present. The quantity of each pollutant emitted depends upon the type and quantity of fuel used, engine size, speed of the vehicle and abatement equipment fitted. Once emitted, the pollutants are diluted and dispersed in the ambient air. Dust may be generated during this phase and might be aggravated during the winter months when strong winds occur. Fall out dust settling on vegetation is likely to cause local disruptions in herbivorous and predatory complexes and should be minimised as far as possible. Dust generated and air pollutants suspended in the air could be inhaled by the workers leading to respiratory diseases.

5.2.2 Noise pollution

Noise pollution can be defined as any disturbing or unwanted noise that interferes or harms human or wildlife. Noise will most likely be generated during overburden removal, drilling, excavation, loading, unloading, crushing, vehicular traffic and the use of generators. It is recommended that operation activities be limited to normal daytime hours. Noise pollution has negative impact on wildlife species by reducing habitat quality, increase stress level and masking other sounds. Continual exposure to loud noise can cause hearing loss, stress, anxiety, depression and high blood pressure to workers.

5.2.3. Health, safety and security

Mining operations are associated with serious health and safety risks to workers on site. Occupational exposures are normally related to the dermal contact with fuels and inhalation of fuel vapors during handling of such products. The manager is further advised to ensure that adequate emergency facilities, including first aid kits, are available on site. All Health and Safety standards specified in the Labour Act should be complied with.

5.2.4. Visual

The proposed quarrying area is situated more than 10 km from any main road. As such, any visual impact that might be caused by the team are minimal. In some parts of the area, the topography of the quarrying site is slightly elevated.



Figure 18: Typical visual impacts from one of the quarries in Karibib.

5.2.5. Solid Waste

Solid waste is a challenge during the ongoing exploration and operational phases. Waste can be generated from contractors, staff members and other visitors to the area. Proper solid waste management will involve full commitment by all the employees and contractors of the site. Solid waste which will be generated from this project if not managed will have an effect on the environment. The types of waste that could be generated during operation include hazardous waste,

general industrial waste (e.g. wires, drill bits, scrap material, etc), and domestic waste. Hazardous waste includes waste oil, waste solvents and other waste with hazardous nature such as flammability, explosiveness, causticity and toxicity these waste will be collected and sent for treatment before disposal.

Domestic waste will be temporarily handled and stored onsite before being removed for final disposal at permitted waste disposal facilities. A registered Waste Management Company would be contracted to remove all hazardous waste from the site. Furthermore, ablution facilities will use chemical toilets and/or sealed septic tanks and the sewerage taken to the Karibib periodically. No waste will be discharged on site.

5.2.6. Biodiversity

The transformation of land for any purpose results in the destruction of the site-specific biodiversity, the fragmentation of habitats, reduces its intrinsic functionality and reduces the linkage role that undeveloped land fulfils between different areas of biodiversity importance. The alteration will occur through physical disturbance and continued human presence and use. Construction and operation activities which are expected to cause destruction of biodiversity and habitats include the movement of vehicles and machinery. Biodiversity impacts resulting from construction and operation activities are likely to include mortality (by earthmoving equipment, vehicles and machinery and due to poaching).

5.2.6.1 Fauna

Quarrying activities may have minor disturbances on the habitat of a few species but no significant impacts on the animals are expected. The proponent shall ensure that no animal shall be captured, killed or harmed by any of the employees in any way. Wildlife poaching will strongly be avoided as this is an offence and anyone caught infringing in this regard will face suspension from the project and will be liable for prosecution.

5.2.6.2. Avifauna

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

5.2.6.3 Vegetation

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

- Bushes
- Ephemeral grasses
- Small trees

Some of the sensitive vegetation types in the area include:

- Shallow drainage line vegetation
- Scrublands surrounding the quarrying area

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

5.2.6.4. Alien invasive plants

Alien invasive plants are prevalent in areas affected by land transformation and anthropogenic disturbance. It is a well-known fact that disturbance to the natural environment often encourages the establishment of alien invasive weed species. Surface mines are a major disturbance, and thus may promote the establishment and expansion of invasive plant communities. Seed or plant material may be imported to site from building materials if the source is contaminated. It is also

possible that, plant or seed material may adhere to car tyres or animals. In some cases seeds of alien invasive plants may blow from debris removed at sites.

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

- *Prosopis glandulosa*
- *Lantana camara*
- *Cyperus esculentus*
- *Opuntia imbricate*
- *Cereus jamacara*
- *Melia azedarach*
- *Harissia martini*

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

5.2.7 Heritage Impacts

Although no archaeological sites have been identified yet in the project area, appropriate measures will be undertaken upon discovering any new archaeological sites. All archaeological remains are protected under the National Heritage Act (2004) and will not be destroyed, disturbed or removed. The Act also requires that any archaeological finds be reported to the Heritage Council Windhoek.

5.2.8. Fire and explosion hazard

Hydrocarbons are volatile under certain conditions and their vapours in specific concentrations are flammable. If precautions are not taken to prevent their ignition, fire and subsequent safety risks may arise. All fuel storage and handling facilities in Namibia must however comply with strict safety distances as prescribed by SANS 10089. SANS 10089 is adopted by the Ministry of Mines and Energy as the national standard. It must further be assured that sufficient water is available for firefighting purposes. In addition to this, all personnel must be sensitised about responsible fire protection measures and good housekeeping such as the removal of flammable materials including rubbish, dry vegetation, and hydrocarbon-soaked soil from the vicinity of the quarrying area.

Regular inspections should be carried out to inspect and test firefighting equipment and pollution control materials at the drilling site.

All fire precautions and fire control at the site must be in accordance with SANS 10089- 1:1999, or better. A holistic fire protection and prevention plan is needed. Experience has shown that the best chance to rapidly put out a major fire, is in the first 5 minutes. It is important to recognise that a responsive fire prevention plan does not solely include the availability of firefighting equipment, but more importantly, it involves premeditated measures and activities to timeously prevent, curb and avoid conditions that may result in fires. An integrated fire prevention plan should be drafted before drilling.

5.2.9 Groundwater contamination

Groundwater pollution is imminent during mining due to increased anthropogenic activities. However, from previous studies dimension stone mining is associated with low potential of groundwater contamination. Sources of pollution can be categorized into two major types: point source pollution and non-point source pollution. Point source pollution(e.g. leaking sewage lines, leaking mobile toilets and fuel, oil, chemical spillage) is a single identify localized source while non-point source pollution (diffuse sources such petrochemical pollution) is characterized by multiple discharge point .Groundwater quality is an important variable as poor-quality water can be unsuitable for use.

The proposed study area has two existing boreholes in a radius of 2 km from which water is sourced. Project activities during construction and operation have the potential to cause contamination through spillages of hydrocarbons, chemicals, hazardous materials, refueling and maintenance of construction vehicles, sewage as well as through poor management of grey water. Heavy vehicles operating at the mining site should be regularly monitored for leaking hydrocarbon fuels (petrol or diesel) and must be fitted with drip trays while they are parked to avoid

contamination of surface and groundwater. Fuel on site will be stored tank mounted on stilts so that any leaks are easily detectable, however if underground fuel storage is to be used it should be lined with heavy duty geo-membranes such as polyvinyl chloride (PVC) or high density polyethylene (HDPE) to prevent groundwater contamination. The total volume of these hazardous materials and chemicals on site is never likely to be substantial and thus the overall risks during construction are not likely to be high. However, groundwater is an important resource and must be protected. The proponent has set out various measures to ensure the protection of groundwater quality.

5.2.10 Liquid waste: oil spillage and wastewater

Potential contamination by hydrocarbon spillages/leaks from vehicles, machinery, fuel storage tanks, potential spillage of effluent from portable toilets and the release of untreated/poorly treated effluent from the wastewater plants. The possible presence of these liquid contaminants at the project has the potential of reaching both groundwater and surface water if there are crevices. Moreover, spillage is a concern although the likelihood of this risk occurrence is low; the impact if it happens is significant, for this reason, the risk is highlighted as a going concern of high priority and therefore mitigation measures to be taken are presented below:

5.2.11 Storage and Utilisation of Hazardous Substances

Hazardous substances are regarded by the Hazardous Substance Ordinance (No. 14 of 1974) as those substances which may cause injury or ill-health to or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitizing or flammable nature or the generation of pressure thereby in certain circumstances. It covers manufacture, sale, use, disposal and dumping as well as import and export. During the mining operations, the use; storage and disposal of these types of hazardous substances, such as explosives, shutter oil, curing compounds, types of solvents, primers and adhesives and diesel, on-site could have negative impacts on the surrounding

environment, if these substances spill and enter the environment therefore these should be put in a lockable bonded store room.

5.2.12Municipal Service Impacts

Dimension stone mining activities will result in additional people on-site, who will require provision of the following services:

- ❖ Potable water for domestic purposes.
- ❖ Temporary toilets during the mining operations.
- ❖ Solid waste management (domestic waste).

Workers will be housed on an identified land parcel for the mining camp to be allocated by the farm owner so as to build temporary houses and provide the necessary amenities for the employees including a renewable source of energy in the form of solar panels to ensure a reasonable standard of living.

Table 10: Impact evaluation for bio-physical environment

Impact	Duration	Extend	Intensity	Probability	Significance	
					NMM	MM
Air quality	ST	L	L	P	H	L
Solid waste generation	LT	O	L	D	M	L
Noise	ST	L	M	LP	M	L
Health, safety and security	ST	O	L	P	H	M
Visual	MT	O	L	LP	M	L
Vegetation	MT	L	M	D	M	L
Fauna	MT	N	L	P	M	L
Avifauna	MT	L	M	LP	M	L
Heritage Impacts	LT	O	H	LP	M	L
Fire and explosion hazard	ST	L	M	LP	H	M
Groundwater contamination	P	L	M	LP	M	L
Wastewater	ST	S	L	HP	M	L
Hazardous Substances	LT	L	M	P	M	L
Municipal Service Impacts	LT	R	L	HP	M	L

6. Environmental Management Plan (EMP)

6.1 Overview

6.1.1. Purpose of this Environmental Management Plan (EMP)

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

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

Furthermore, overall objectives of this EMP are:

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

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

6.1.2. Summary of the proposed activities

The proponent has a mining Licence application (ML236) over the Project site. Quarrying operations, processes and associated activities have potential impacts on the following:

- Potential land or soil disturbances;
- Soil and water resources contamination;
- Biodiversity (fauna and flora);
- Air quality/dust;
- Noise;
- Health and safety;
- Vehicular traffic safety; and
- Visual (aesthetic) and
- Archaeological impact.

6.1.3. Project Phases Covered in the EMP

The following phases are addressed in this EMP:

- **Construction phase:** The initial phase which entails construction of main and supporting mining infrastructures (Mine Development).

- **Operation and maintenance phase:** the phase during which the quarrying activities are carried out and maintenance of the site, related infrastructure, equipment and machinery is done.
- **The decommissioning phase** is the time during which the targeted dimension is depleted or of no longer economic value, leading to the cessation of the mining activities. During the operational phase and before decommissioning, the Proponent will need to put site rehabilitation measures in place. The decommissioning phase is followed by mine closure and aftercare

6.1.4 Legal Implications and obligations under the EMP

The EMP will be sent to the Directorate of Environmental Affairs (DEA) of the Ministry of Environment, Forestry and Tourism (MEFT) for approval. Once the DEA is satisfied with the contents of the EMP, they will issue an Environmental Clearance Certificate (ECC) to the Proponent to commence with the establishment of the quarry for marble and granite in the proposed area. The ECC is linked with the recommendations of the Environmental Management Plan. Once the ECC is issued, the EMP becomes a legally binding document and each role-player including contractors and sub-contractors are made responsible to implement the relevant sections of the EMP and is required to abide by the conditions stipulated in this document

6.1.5 Environmental Management Principles

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

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

2. Health, Safety and Social Well Being

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

3. Biophysical Environment

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

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

Commitment and Accountability:

The proponent's senior executives and line managers will be held responsible and accountable for: Health and safety of site personnel while on duty, including while travelling to and from site in company vehicles and environmental impacts caused by quarrying activities or by personnel

engaged in the quarrying activities, including any recreational activities carried out by personnel in the area

Competence

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

Risk Assessment, Prevention and Control

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

Performance and Evaluation

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

Stakeholder Consultation

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

Continual Improvement

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

Financial Provisions for Quarrying

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

6.2. Identified impacts, monitoring and proposed mitigation measures

6.2.1. Positive social-economic impacts

6.2.1.1. Job Creation

Local recruitment will be encouraged by the proponent with a target of at least 65% locals. This operation thus contributes to the alleviation of unemployment which is severe in the country. The establishment and operation of the quarry will create both direct and indirect jobs for at least minimum 50 people. Employment on the new project will be attractive to the local workforce by virtue of the comparatively high wages offered, this will result in the local growth in the economy of Karibib constituency and surrounding areas.

Enhancement measures

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

6.2.1.2. Support to local retailers shop

Mining is the highest foreign currency earner and GDP contributor to the Namibian economy, therefore the presence of mining activities near local authorities stand to benefit the local economies from project-related purchases, for example, the retail, accommodation and recreation sectors. The proponent and his employees are encouraged to purchase or support local retailers

in Karibib town unless the intended material/product to purchase is not available.

6.2.1.4. Export taxes and VAT payments

Export taxes and VAT payments contribute significantly to the national economic contribution. Thus, without these payments our government will not be able to roll out the project on infrastructure, being it water, road or electricity and also sanitation facilities nationwide. The proponent and his employees are encouraged to make these payments when applicable to support the economic growth of the country.

6.2.1.5. Supply of raw materials

Supply of raw materials and processed materials to downstream industry for economic growth. In addition to construction, dimension stone is also needed for monumental, as the raw material for sculpture and tombstones. This industry will also add local value addition for the processing of blocks (waste) that cannot be sold as complete blocks.

6.2.2. Impacts on bio-physical environment

6.2.2.1. Liquid waste: oil spillage and wastewater

Mitigation Measures to be enforced:

- Ensure adequate storage and handling of liquid waste, fuel, waste water as well as regular maintenance of plant equipment.
- Avail a spill response action plan in case of accident.
- Accessibility to spill prevention and response equipment, such equipment should be visible and accessible to all employees at any given time.
- Spills will be cleaned up immediately to the satisfaction of the Regional Manager by removing the spillage together with the polluted soil and by disposing of them at a recognized facility.

- Designated waste collection tanks should be available on-site and away from waterways, and such isolation should be maintained at all times.
- Storage of the hazardous substances in a bounded area,
- Refuel vehicles at a designated area that has a protective surface covering/geo-membrane lining and utilize drip trays for stationary plant.

6.2.2.2 Impacts on surface water

Mitigation Measures to be enforced:

- No dumping of waste products of any kind in or in close proximity to surface water bodies.
- Heavy mining vehicles should be kept out of any surface water bodies and the movement of vehicles should be limited where possible to the existing roads and tracks.
- Ensure that oil/ fuel spillages from vehicles transporting the stones and machinery are minimized and that where these occur, that they are appropriately dealt with.
- Drip trays must be placed underneath vehicles when not in use to contain all oil that might be leaking from these vehicles.

6.2.2.3. Solid waste

Solid waste is a challenge during the ongoing exploration and operational phases. It can be generated from contractors, staff members and other visitors to the area. Proper solid waste management will involve full commitment by all the employees and contractors on site. Solid waste which will be generated from this project if not managed will have an effect on the environment.

Mitigation Measures to be enforced:

- Sufficient waste disposal sites should be established on-site where generated waste should be kept during ongoing exploration and operation period.

- The collected solid waste should be disposed of at Karibib Town Council solid waste disposal sites.
- For human waste, during the construction phase, the mobile toilet should be made available on-site for workers and once these facilities are full, the collected human waste should be disposed at the Town Council human waste disposal site.
- It is recommended that waste from the temporary toilets be pumped out and disposed of at the designated waste treatment site in Karibib.
- Mandatory waste segregated right at the source of waste generation. The collection of segregated waste would be made from the quarrying site and amenity areas.
- Reusable and recyclable waste will be disposed of by selling to scrap dealers and private contractors for resale.
- Non-degradable waste will be transferred to the municipal solid waste management system.

6.2.2.4. Land and soil disturbance

Dimensions stone mining process involve cutting out prismatic blocks from in situ granite and marble outcrops and therefore disturbing the landform and the soil cover in the immediate surroundings of the mining site. This undertaking has the potential of disturbing the structural composition and biological productivity of topsoil and If not taken care of this can lead to land degradation.

Mitigation Measures to be enforced:

- The access road to the mining site must be established in consultation with the landowner and usage of existing roads shall be enforced.
- The design, construction, and location of access to main roads will be in accordance with the requirements laid down by the controlling authority.
- Land markings, vehicle tracks, trenches and excavations shall be restored to the original landform and, visual state as much as possible.

- In the case of dual or multiple uses of access roads by other users, arrangements for multiple responsibilities must be made with the other users. If not, the maintenance of access roads will be the responsibility of the holder of the mining licence (ML).

6.2.2.5. Biodiversity (fauna and flora)

Mining can be destructive process, changing abiotic and biotic conditions and in some cases singlehandedly causing local decline in rare and threatened species and ecosystems. Some of the activities of the proposed project i.e. vehicles, human movements, excavating pose a risk to the integrity of baseline biodiversity as well as the biological productivity of the site and the immediate proximity. Movement of vehicles in and out of the site and noise produced by moving earth-moving equipment are the major threats to fauna .The following mitigations are to be undertaken to minimize further impact on the existing biodiversity:

Mitigation Measures to be enforced: flora

- Disturbed areas must be kept to a minimum.
- Remove unique fauna and sensitive fauna before commencing with the development activities and relocate to a less sensitive/disturbed site if possible.
- Recommend the planting of local indigenous species of flora as part of the landscaping as these species would require less maintenance than exotic species and have important ecological functions in terms of carbon sequestration from decomposing materials at the site.
- Disturbance of marginal vegetation in the mountains should be limited.
- Where it is clear that certain large species will be destroyed consideration should be given to offering to rescue the individuals involved and relocate them to nearby gardens.
- Transplant removed trees where possible, or plant new trees in lieu of those that have been removed.
- Prevent the destruction of protected tree species.

Mitigation Measures to be enforced: fauna

- Barriers/barricades confining driving trucks must be erected to avoid stray driving and trampling on habitat. Proper demarcation of the mining and exploration area.
- Avoid disturbance on invertebrate on-site and along the gravel road stretch.
- Avoid the creation of multiples roads strips, which could result in the disturbance of breeding sites for various mammals.
- No workers will be allowed to collect any plant or snare, hunt or otherwise capture any wild animal.
- No domestic animals will be permitted on the quarry sites by means of erecting a perimeter fence, small stock should graze at designated areas.
- A fauna survey will be conducted to determine the effect of fragmented habitat on game species should the need arise.
- No foodstuff will be left lying around as these will attract animals which might result in human-animal conflict.
- Care will be taken to ensure that no litter is lying around as these may end up being ingested by wild animals

Methods for monitoring:

- Regular monitoring of any unusual signs of animal habitat.
- There should be limited movement of heavy duty machinery and mining equipment in the area to avoid interference.
- Birds or Nest sites will not be disturbed by any employee, visitor or contractor.
- If possible encountered bird kills and nest removal should be registered in a biodiversity data-base and information should be made available to the general public

6.2.2.6. Impacts of Alien invasive Plants

Alien invasive plants are prevalent in areas affected by land transformation and anthropogenic disturbance. It is a well-known fact that disturbance to the natural environment often encourages

the establishment of alien invasive weed species. Surface mines are a major disturbance, and thus may promote the establishment and expansion of invasive plant communities. Seed or plant material may be imported to site from building materials if the source is contaminated. It is also possible that, plant or seed material may adhere to car tyres or animals, in some cases seeds of alien invasive plants may blow from debris removed at sites.

Mitigation Measures to be enforced:

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

Methods for monitoring:

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

6.2.2.7. Air quality

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

Mitigation Measures to be enforced

- Dust suppressants shall be applied to all the mining activities as well as all the unpaved/gravel roads.
- The speed of haul trucks and other vehicles must be strictly controlled to excessive dust or excessive deterioration of the road being used.
- All gravel roads in the project area should have a speed limit of 60km/h for light vehicles and 30km/h for heavy vehicles in order to minimize the amount of dust generated by vehicles.
- Transportation of raw materials required for construction will be carried out during non-peak hours.
- Covering scaffolding and cleaning of vehicles that can reduce dust and vapor emissions will be used.
- Cover any stockpiles with plastic to minimise windblown dust.
- During high wind conditions the proponent must make the decision to cease works until the wind has calmed down.
- Use of personal protective equipment for proper dust control for respiratory protection and other necessary PPE (gloves, work suits, sun hats etc.).

Monitoring

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

6.2.2.8. Impacts on Archaeological Sites

Potential damage to archaeological sites may be impacted through unintentional destruction or damage as a result of vehicle tracks, footprints and actions of contractors, employees and visitors of the quarrying site. Currently, there is no information provided about known heritage or site of cultural values within the project site. Therefore, this impact can be rated medium to low, if there are no mitigation measures in place. At the sites, there are no known heritage areas or artifacts deemed to be impacted by the ongoing exploration and quarrying activities. However, there might be unknown archaeological remains within the Mining Licence area hence the Proponent is required to follow the chance find procedures and consult the Heritage Council immediately. The Proponent should consider having a qualified and experience archaeologist on standby during entire operational phase. This action will be to assist on the possibility of uncovering sub-surface graves or other cultural/heritage objects and advice the Proponent accordingly. Identified graves or any archaeological significant objects on the site should not be disturbed, but are to be reported to the project Environmental officer or National Heritage Council offices.

Mitigation Measures to be enforced

- Buffer zones will be created around the operation site.
- Adhere to practical guidelines provided by an archaeologist to reduce the archaeological impact of quarrying activities.
- All archaeological sites to be identified and protected before construction commences.
- Notices/information boards will be placed on sites.
- Training employees regarding the protection of these sites.
- Obtain appropriate clearance or approval from the competent authority.
- In the event of such finds, mining must stop and the project management or contractors should notify the National Heritage Council of Namibia immediately.

Monitoring

- An archaeologist will inspect any identified archaeological sites before commencing with the quarrying activities.

6.2.2.9. Noise

Noise emissions on site are mainly generated by earthmoving equipments, drilling rigs, wire saw, people and vehicles. The main noise sources are associated with drilling, breaking, crushing and transport of equipment or materials to or from the quarry site. Exposure to loud noises at work can cause irreversible hearing damage, workplace accidents and be a contributing factor to other health problems.

Mitigation Measures to be enforced

Continuous monitoring of noise levels should be conducted to make sure the noise levels at the mining site does not exceed acceptable limits.

- Reduction of noise from drilling rigs by using down hole drilling or hydraulic drilling;
- Installation of proper sound barriers and (or) noise containments, with enclosures and curtains at or near the source equipment.
- Use of rubber-lined or soundproof surfaces on processing equipment (e.g. screens, chutes, transfer points, and buckets);
- Use of rubber-belt transport and conveyors;
- Installation of natural barriers at facility boundaries (e.g. Vegetation curtains or soil berms).
- Optimization of internal-traffic routing, particularly to minimize vehicle-reversing needs (reducing noise from reversing alarms) and to maximize distances to the closest sensitive receptors.
- No activity having a potential noise impact should be allowed after 18:00 hours if possible.
- In the event that activities continue outside the stipulated hours the contractor will

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

- Workers working near high noise mining machinery will be provided with ear muffs/earplugs.

6.2.2.10 Storm water and erosion Control

Mitigation Measures to be enforced

- Regular preventative maintenance should be carried out on the quarry infrastructure.
- Earth embankments to prevent erosion will be established where appropriate.
- The surface water accumulated in the open trenches must be channelled along the natural tributaries of area.
- It is recommended that granite mining takes place outside of the rainy season in order to limit flooding on site and surface water pollution.
- Storm water Management Plans should be developed for each quarry/claim site and should include the management of storm water during excavation, as well as the installation of storm water and erosion control infrastructure and management thereof after completion of mining.
- Storm water management systems will be installed to prevent storm water from entering or exiting the quarry, which could result in silt laden surface water from draining into any ephemeral river systems that may be in proximity to the mining claim site.
- Quarry slopes should be profiled to ensure that they are not subjected to excessive erosion but capable of drainage run-off with minimum risk of scour (maximum 1:3 gradient).
- If necessary, diversion channels should be constructed ahead of the open cuts as well as above emplacement areas and stockpiles to intercept clean run-off and divert it around disturbed areas into the natural drainage system downstream of the quarry.
- All mined areas (where works will take place) will be rehabilitated to control erosion and sedimentation.
- Existing vegetation must be retained as far as possible to minimise erosion problems.
- Rehabilitation of quarries shall be planned and completed on a continuous basis in such a way that the run-off water (if any) will not cause erosion.
- Visual inspections shall be done on a regular basis with regard to the stability of water control structures, erosion and siltation (if required).

6.2.2.10. Topsoil disturbance

Topsoil shall be removed from all areas where physical disturbance of the surface will occur, prior to the disturbance occurring. Topsoil refers to that layer of soil covering the earth and which provides a suitable environment for the germination of seeds, allows the penetration of water, and is a source of micro-organisms, plant nutrients and in some cases seed.

Mitigation Measures to be enforced

- Topsoil shall be stored so that it can be placed on the exposed subsoil as soon as the mining of the excavation or the relevant section of it has been completed and its slopes have been finished off to the acceptable gradient as part of the rehabilitation process.
- Topsoil shall be stockpiled only in the areas dedicated for only that purpose, even if the topsoil is only partially cleared.
- The topsoil removed, shall be stored in a bund wall on the high ground side of the quarry and in such a way that it will not cause damming up of water or wash ways, or wash / blow away itself. Stockpiles will not exceed a height of **two** meters.
- Stockpiles shall be managed so as to maintain the re-growth potential of the topsoil. Should the stockpiles stand for too long (greater than 12 months) it can be considered barren from a seed bank point of view. In this case reseeded may be required. Stockpiles should ideally be stored for no longer than six months.
- The overburden, i.e., that layer of soil immediately beneath the topsoil, will be removed and stored separately from the topsoil.
- No chemical pollution shall be allowed to contaminate the soils; any plant equipment found to be attributing to this shall be removed from the site and repaired.

6.6.2.11. Visual negative impacts

Mitigation Measures to be enforced

- Negative visual effects can further be prevented through mitigations (i.e. keep existing trees, introduce tall indigenous trees).
- Quarries should be levelled mining activities cease so as to restore the visual sense of place of the area to its natural state.
- The remains of all structures that may have been erected at the quarry shall be demolished and removed on completion of the project.
- Care must be taken to ensure that all rehabilitated areas are similar to the immediate environment in terms of visual character, vegetation cover and topography and any negative visual impacts will be rectified to the satisfaction of the environmental consultant.
- Overburden will be placed back into excavation as part of the rehabilitation programme

6.2.2.12 Fire and Explosion Hazard

Mitigation Measures to be enforced

- Sufficient fire extinguishers will be installed at selected locations such as mine office, garage. Sufficient water hydrants with sufficient length of hosepipes will be made available on the surface for fire protection.
- Mine personnel will be trained on how to use fire extinguishers.

6.2.2.13. Health, safety and security

There are number of hazards associated with the movement of equipments and impact on dangerous parts of the equipment. The risk of an accident will be high if the dangerous parts are exposed and operators are poorly trained or supervised. This increases the possibility of injuries

and the responsible manager must ensure that all staff members are briefed about the potential risks of injuries on site.

Mitigation Measures to be enforced:

- All vehicular equipment operators must have valid licences for that particular vehicle class.
- Personnel should not overnight at the mining site, except the security personnel.
- Ensure that all mining personnel are properly trained depending on the nature of their work.
- Provide for a first aid kit and a properly trained person to apply first aid when necessary.
- A wellness program should be initiated to raise awareness on health issues, especially the impact of sexually transmitted diseases as described above.
- Encourage HIV counselling and testing and facilitate access to Antiretroviral (ARV) medication
- Restrict unauthorised access to the mining claim site and implement access control measures.
- Clearly demarcate the mining claim site boundaries along with signage of “no unauthorised access”.
- Clearly demarcate dangerous areas and no go areas on site.
- Staff and visitors to the mining claim site must be fully aware of all health and safety measures and emergency procedures.
- The contractor must comply with all applicable occupational health and safety requirements.
- The workforce should be provided with all necessary Personal Protective Equipment where appropriate.
- Emergency medical treatment should be available on site.

6.2.3. Negative Impacts on Socio-Economic

The **nature of impact** is outlined below:

- Impact from loss of grazing for domestic livestock in “exclusive use zone”
- Impacts on cultural and spiritual values.
- Demographic factors: Attraction of additional population that cannot benefit from the project.
- Perception of Health and Safety risks associated with quarrying.

Mitigation Measures to be enforced:

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

Methods for monitoring:

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

6.3. Environmental Management Plan, Organization and Implementation

The environmental aspects which may be affected by the proposed project have been categorized into negative and positive impacts. As an extension of the preceding sections, this section summarizes the objectives, indicators to be observed, schedules to adhere to, and the roles and responsibilities of various stakeholders to the EMP. The following tables give the mitigation measure to be undertaken during construction, operation and decommissioning phases with the agency responsible for implementation. The following abbreviations are used to indicate who is responsible for what impact mitigation objective:

- Site Foreman SF
- Site/mine Manager SM/MM
- Project manager PM
- Project Proponent PP
- Project Geologist PG

- Environmental Coordinator ENC
- Contractor C
- Geological Technician GT
- Project staff PS

Table 11: Implementing of the negative impacts. All the mentioned impacts in the below table are scheduled for all the phases of the proposed project.

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

Table 12: Summary of Environmental Management Plan during construction, operation and decommissioning phases.

Construction Phase			
Environmental Impact	Proposed mitigation measures	Responsibility	Monitoring plan
Air pollution	<ul style="list-style-type: none"> Control speed and operation of construction vehicles. Regular maintenance of vehicles and equipment. Sensitize quarrying workers and contractors. Provide dust masks to everyone on site. 	C SM PM ENC	<ul style="list-style-type: none"> Amount of dust produced. Level of Landscaping executed.
Noise pollution	<ul style="list-style-type: none"> All noise sources should be removed from site or kept within reasonable level. Work should only be carried out only during daytime. Regular maintenance of vehicles, equipment. Regular maintenance of and heavy machinery, vehicles and equipment. Workers should be provided with personal hearing protection if working in noisy environment. 	C GT SM ENC	<ul style="list-style-type: none"> Amount of noise produced
Solid waste	<ul style="list-style-type: none"> Littering should be discouraged. Any debris/litter should be collected by a waste collection company The site should have waste receptacles with bulk storage facilities at convenient points to prevent littering during quarrying. 	PM SM ENC	<ul style="list-style-type: none"> Presence of dust bins, waste collection point.
Oil leaks and spills	<ul style="list-style-type: none"> Vehicles and equipment should be well maintained to prevent oil leaks. Contractor should have a designated area where maintenance is carried out and that is well sealed to prevent percolation into the ground. All oil products should be handled carefully. 	C ENC SM	<ul style="list-style-type: none"> Absence of oil spills and leaks onsite
First aid	<ul style="list-style-type: none"> A well-stocked first aid kit shall be maintained by qualified personnel 	PM	<ul style="list-style-type: none"> Contents of the first aid kit.
Visual	<ul style="list-style-type: none"> Environmental considerations will always be adhered to before clearing roads, trenching and excavating. 	PM GT	<ul style="list-style-type: none"> Employees to be trained on how to minimize visual impacts.

Archaeological Sites	<ul style="list-style-type: none"> • Buffer zones will be created around the sites. • Adheretopracticalguidelinesprovidedbyanarchaeologisttoreducethearchaeologicalimpactofquarryingactivities. • Allarchaeologicalsitestobeidentifiedandprotectedbeforefurtherquarryingcommences. 	PM ENC PP SM	<ul style="list-style-type: none"> • Register of all archaeological sites identified.
Occupational Health and Safety	<ul style="list-style-type: none"> • Provide Personal Protective Equipment Train workers on personal safety and how to handle equipments and machines. • A well-stocked first aid kit shall be maintained by qualified personnel. • Report any accidents / incidences and treat and Compensate affected workers. • Provide sufficient and suitable sanitary conveniences which should be kept clean. 	C PM PP	<ul style="list-style-type: none"> • Workers using Protective Equipment. • Presence of Well stocked First Aid Box. • Clean sanitary facilities.
Fauna	<ul style="list-style-type: none"> • Some habitat areas such as trees of the river bed and tunnels outcrops will be avoided wherever possible. • A fauna survey will be conducted to determine the effect of fragmented habitat on game species should the need arise. • No animals shall be killed, captured or harmed in any way. • No foodstuff will be left lying around as these will attract animals which might result in human-animal conflict. 	PM ENC PP SM	<ul style="list-style-type: none"> • Regular monitoring of any unusual signs of animal habitat.
Alien invasive plants	<ul style="list-style-type: none"> • Eradicating alien plants by using an Area Management Plan. • Ensure vehicles and equipment are clean of invasive plants and seeds. • Contain neighboring infestations and restrict movement of invasive plants from adjacent lands • Educating everyone on site on types of invasive plants. 	PM ENC PP SM	<ul style="list-style-type: none"> • Regular monitoring of any signs of alien plants.
Loss of vegetation	<ul style="list-style-type: none"> • Environmental considerations will be adhered to at all times before clearing roads, trenching and excavating. • The movement of vehicles in riverbeds, rocky outcrops and vegetation sensitive areas will be avoided. • The movement of vehicles will be restricted to certain tracks only. 	PM ENC PP SM	<ul style="list-style-type: none"> • Warning signs onsite • Restored vegetation

Operational Phase

Environmental /Social Impact	Proposed mitigation measures	Responsibility	Monitoring plan
Noise pollution	<ul style="list-style-type: none"> • Maintain vehicles and drilling equipment. • All noise sources should be removed from site or kept within reasonable level. • Work should only be carried out only during day time. • Regular maintenance of vehicles, equipment. • Regular maintenance of and heavy machinery, vehicles and equipment. • Workers should be provided with personal hearing protection if working in noisy environment. 	PM ENC PP SM MM C	<ul style="list-style-type: none"> • Amount of noise produced
Visual	<ul style="list-style-type: none"> • Environmental considerations will be adhered to at all times before clearing roads and excavating. 	PM, ENC GT	<ul style="list-style-type: none"> • Employees to be trained on how to minimize visual impacts
Fauna	<ul style="list-style-type: none"> • Some habitat areas such as trees of the river beds and tunnels outcrops will be avoided wherever possible. • Afaunasurveywillbeconductedtodeterminetheeffectoffragmentedhabitatongamespeciesshould the need arise. • No animals shall be killed, captured or harmed in any way. • No foodstuff will be left lying around as these will attract animals which might result inhuman-animal conflict. 	PM ENC PP MM C	<ul style="list-style-type: none"> • Regular monitoring of any unusual signs of animal habitat.
Alien invasive plants	<ul style="list-style-type: none"> • The explorer will ensure that debris is properly disposed of. • Ensure vehicles and equipment are clean of invasive plants and seeds. • Contain neighboring infestations and restrict movement of invasive plants from adjacent lands • Educating everyone on site on types of invasive plants • Eradicating alien plants by using an Area Management Plan 	PM ENC PP MM C	<ul style="list-style-type: none"> • Regular monitoring of any signs of alien species.

Loss of vegetation	<ul style="list-style-type: none"> • Environmental considerations will be adhered to at all times before clearing roads, trenching and excavating. • Paths and roads will be aligned to avoid root zones. Permeable materials will be used wherever possible. • The movement of vehicles in riverbeds, rocky outcrops and vegetation sensitive areas will be avoided. • The movement of vehicles will be restricted to certain tracks only. 	PM ENC PP MM C	Warning signs onsite Restored vegetation
Solid waste	<ul style="list-style-type: none"> • Minimize solid waste generated onsite. • Recycle waste especially waste from trenching. • Debris should be collected by waste collection company. • Excavation waste should be re-used or backfilled. 	PM C	Amount of waste on Site. Presence of dust bins, waste collection point
Oil leaks and spills	<ul style="list-style-type: none"> • Machinery should be well maintained to prevent oil leaks. • Contractor should have a designated area where maintenance is carried out and that is protected from rainwater. 	PM ENC PP MM C	No observed oil spills and leaks on site.

Archaeological Sites	<ul style="list-style-type: none"> • Buffer zones will be created around the sites. • Adheretopracticalguidelinesprovidedbyanarchaeologisttoreducethearchaeologicalimpac tofquarryingactivities. • All archaeological sites to be identified and protected before further quarrying commences. 	PM	Up to date Register of all archaeological sites identified.
First aid	<ul style="list-style-type: none"> • A well stocked first aid kit shall be maintained by qualified personnel 	PM	Contents of the first aid kit.

Fire preparedness	<ul style="list-style-type: none"> • Firefighting emergency response plan. • Ensure all firefighting equipment are always available, regularly maintained, serviced and inspected. • Fire hazard signs and directions to emergency exit, route to follow and assembly point in case of any fire incidence. 	PM	Fire Signs put up in strategic places. Availability of well maintained firefighting equipments.
Environment Health and Safety	<ul style="list-style-type: none"> • Train workers on personal safety and disaster preparedness. • A well-stocked first aid kit shall be maintained by qualified personnel. • Report any accidents/ incidences and treat and compensate affected workers. • Provide sufficient and suitable sanitary conveniences which should be kept clean. • Conduct Annual Health and Safety Audits. 	PM	Provide sanitary facilities. Copies of Annual Audit
	Decommissioning Phase		
Environmental/Social Impact	Proposed mitigation n measures	Responsibility	Monitoring plan/indicator
Noise and air pollution	<ul style="list-style-type: none"> • Maintain plant equipment. • Decommissioning works to be carried out only during daytime. • personal hearing protection must be worn by workers in noisy section • Workers should be provided with dust masks. 	C PM	Amount of noise and dust generated
Disturbed Physical environment	<ul style="list-style-type: none"> • Undertake a complete environmental restoration programme and introducing appropriate vegetation 	PM	
Solid waste	<ul style="list-style-type: none"> • Solid waste should be collected by contracted waste collection company. • Excavation waste should be used or backfilled 	C PM	Amount of waste on site. Presence of well-maintained receptacles and central collection point.

Occupational Health and Safety	<ul style="list-style-type: none"> • Provide Personal Protective Equipment. • Train workers on personal safety and how to handle equipments and machines. • A well stocked first aid kits shall be maintained by qualified personnel. • Demarcate area under decommissioning. 	C PM	Workers using Protective Equipment. Presence of a First Aid Box.
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6.4. Monitoring, reporting and corrective action

6.4.1 Monitoring of EMP

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

- Monitoring of project activities and actions to be undertaken by the Environmental Coordinator (ENC) appointed by the Contractor.
- The Environmental Coordinator (ENC) shall report all incidents and situations which have the potential of jeopardizing compliance of statutory provisions as well as

provisions of this EMP to the Project Proponent.

- The Environmental Coordinator (ENC) shall take corrective prompt measures, adequate and long-lasting in addressing non-compliance activities or behavior.

To ensure compliance of the Contractor ENC to the implementation of the EMP, it is highly recommended that an External Environmental Expert is appointed by the proponent to ensure the implementation of the EMP.

6.4.2.1. Inspections and Audits

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

6.4.2.1.1. Internal Inspections/Audits

The following internal compliance monitoring programme will be implemented:

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

6.4.2.1.2 External Audits

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

6.4.3 Documentation

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

6.4.4 Reporting

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

6.4.5 Environmental management system framework

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

6.4.5.1 Policy and Performance Standards

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

6.4.5.2 Enviro-Legal Documentation

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

6.4.6 Impact aspect register

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

6.4.6.1 Procedures and Method Statements

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

- Standard operating procedures for environmental action plan and management programme execution.
- Incident and emergency response procedures.

- Auditing, monitoring and reporting procedures, and
- Method statements for EMP compliance for ad hoc activities not directly addressed in the EMP action plans.

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

6.4.6.2 Register of roles and responsibilities

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

6.4.6.3 Site Map

An up to date map of the quarrying site indicating all project activities is to be maintained. In addition to the project layout, the following detail must be depicted:

- Materials handling and storage;
- Waste management areas (collection, storage, transfer, etc.);
- Sensitive areas;
- Incident and emergency equipment locations; and Location of responsible parties.

6.4.6.4 Environmental management schedule

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

- Environmental risk assessment;
- Environmental management meetings;

- Soil handling, management and rehabilitation;
- Waste collection;
- Incident and emergency response equipment evaluations and maintenance
- Environmental training;
- Stakeholder engagement;
- Environmental inspections and
- Auditing , monitoring and reporting

6.4.6.5 Change Management

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

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

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

6.5. Environmental code of conduct

The Code of Conduct outlined in this section of the EMP applies to, subcontractors, visitors, permanent and temporal workers. Therefore, anybody within the boundaries of the project site must adhere to the Environmental Code of Conduct as outlined in this section of the EMP.

The Environmental Coordinator ENC will implement on-site environmental guidelines and has the authority to issue warnings as well as discipline any person who transgresses environmental rules and procedures. Persistent transgression of environmental rules will result in a disciplinary hearing and thereafter continued noncompliance behavior will result in permanent removal from the construction sites.

6.6 Site closure and rehabilitation

6.6.1 Introduction

The closure period will commence once the last planned blocks of dimension stone has been extracted from the quarry, at the end of the active mining period. The scope of the proponent site rehabilitation emphasizes the backfilling of excavated quarries and sampling holes with previously removed top soil and overburden rocks. Mine rehabilitation is the process of repairing the damage done by mining activities. Rehabilitation plan has been developed with a main aim of returning disturbed environment close to its pre mining state. It is also planned to cater for the access road, vehicle tracks around the site, removal, and restoration of areas covered by stockpile and rock piles. The closure vision for the proposed project is to establish a safe, stable and non-polluting post-prospecting landscape that can facilitate integrated, self-sustaining and value generating opportunities, thereby leave a lasting positive legacy.

6.1. Site closure and rehabilitation

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

- No roads are anticipated to be constructed to access the site; existing roads will be used as far as possible. Where access tracks have been developed in cases where there are no roads, these will be rehabilitated and closed as part of normal closure actions.
- Rehabilitated area will be re-vegetated with the objective of creating a sustainable ecosystem. Vegetation establishment will be in line with a project area's indigenous vegetation.
- The recovered topsoil and subsoil should be utilized to reconstruct the original soil profile.
- All rehabilitated areas shall be considered no go areas and the environmental coordinator shall ensure that none of the staff members enters the area after rehabilitation.

- A site inspection will be held after completion of the mining process to determine the nature and scope of the rehabilitation work to be undertaken. The rehabilitation will be done to the satisfaction of both the proponent and METF.

6.6.1 Alternatives Considered

Considering that this is a uniform mining project with no chemical processing involved, the proposed project is not complex, and the risks associated with prospecting are understood and can be mitigated at closure. Alternative options for closure are limited. There are only two options that have been considered as activity alternatives for the closure plan:

- **Preferred Alternative:** Closure or backfill of quarries and trenches with overburden removed during mining.
- **Alternative 2:** To leave trenches, quarries open, in-order to allow for groundwater recharge by surface run-off.

6.6.2 Preferred Alternative: Rehabilitation/ Backfill of boreholes

Rehabilitation is the restoration of a disturbed area that has been degraded as a result of activities such as mining, road construction or waste disposal, to a land use in conformity with the original land use before the activity started. This also includes aesthetical considerations, so that a disturbed area will not be visibly different to the natural environment. This also involves maintaining physical, chemical and biological ecosystem processes in degraded environments, hence the preferred option of backfilling the boreholes with the overburden removed during development and cover with growth medium to establish vegetation. This option has several advantages as discussed below:

Advantages:

- The site will be aesthetically acceptable;
- The site will blend in with the environment;
- The site will be a suitable habitat for fauna and flora again.
- The site will be safe and pollution free;

- Re-vegetating the site will ensure that the site is non-erodible.

Opting for alternative 1, which is to leave trenches without backfilling poses a risk in that, these boreholes may fill in with water, which may become attractive to wildlife and communities leading to drowning and the risk of being trapped in the declines. To mitigate these risks, it is necessary to backfill. Treatment technologies should be used to prevent decanting.

6.6.3 Closure Assumptions

This closure plan has been developed based on limited available information including environmental data. Some of the information currently available may need to be supplemented during the operational period. Therefore, several assumptions were made about general conditions, and closure and rehabilitation of the facilities at the site to develop the proposed closure actions. As additional information is collected during operations, these assumptions will be reviewed and revised as appropriate.

The assumptions used to prepare this plan include the following:

- The closure period will commence once the last planned weight of minerals has been extracted from the site.
- The proposed mining sites will be adhered to to minimise the potential impacts.
- Vegetation establishment will be in line with a project area's indigenous vegetation.
- Water management infrastructure developed for the operational phase will be retained for closure /end of the life of the project as necessary.
- There are limited opportunities for any infrastructure to be built on site and if any infrastructure is built, it will be of limited benefit to the community. Therefore, all buildings will be demolished.
- All hazardous and domestic waste will be transported offsite for disposal in licensed landfills.
- No roads are anticipated to be constructed to access the site; existing roads will be used as far as possible. Where access tracks have been developed in cases where there are no roads, these will be rehabilitated and closed as part of normal closure actions.

6.6.4 Closure and Rehabilitation Activities

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

6.6.4.1 Infrastructure

All infrastructures will be decommissioned, and the footprints rehabilitated for the establishment of vegetation. Material inventories will be managed near the end of mining activities to minimize any surplus materials at closure. Where practicable, equipment and materials with value not needed for post-closure operations will be sold and or removed from the site. Equipment with scrap or salvage value will be removed from the site and sold to recyclers.

A soil contamination investigation will be conducted on completion of demolition activities. The purpose of this is to identify areas of possible contamination and design and implement appropriate remedial measures to ensure that the soil contaminants are removed. Closure actions will include:

- All power and water services to be disconnected and certified as safe prior to commencement of any decommissioning works;
- All remaining inert equipment and decommissioning waste will be disposed to the nearest licensed general waste disposal facility;
- Salvageable equipment will be removed and transported offsite prior and during decommissioning;
- All tanks, pipes and sumps containing hydrocarbons to be flushed or emptied prior to removal to ensure no hydrocarbon/chemical residue remains;

6.6.4.2 Roads

Existing roads will be used as far as possible. Closure actions concerning roads and parking areas will include:

- Removal of all signage, fencing, shade structures, traffic barriers, etc.
- All ‘hard top’ surfaces to be ripped along with any concrete structures.
- All potentially contaminated soils are to be identified and demarcated for later remediation; and
- All haul routes that have been treated with saline dust suppression water need to be treated, with the upper surface ripped and removed to designated contaminant disposal areas.

6.6.4.3 Remediation of Contaminated Areas

All soil, contaminated with hydrocarbons, will be identified, excavated, if possible, to at least 200 mm below the contaminated zone and then treated.

- All tanks, pipes and sumps containing hydrocarbons will be flushed or emptied.
- Removed soils will be managed as determined by the nature and extent of the contamination.
- Liquid storage tanks will be emptied, the structure removed/demolished and sub-surface holes filled; and
- All equipment in which chemicals have been stored or transported will be cleaned and disposed of in a suitable disposal facility.

6.6.4.4 Vegetation

Successful re-vegetation will help control erosion of soil resources, maintain soil productivity and reduce sediment loading in streams utilizing non-invasive plants that fit the criteria of the habitat (e.g. soils, water availability, slope and other appropriate environmental factors). Invasive species will be avoided, and the area will be managed to control the spread of these species. To counter the effects of erosion, naturally occurring grassland species will be planted on slopes. These species will provide soil holding capacity and reduce runoff velocity. The flatter areas will be re-vegetated with the objective of creating a sustainable ecosystem. The occurrence of protected plant species will need to be determined before vegetation is removed and the required permits will be obtained for either destruction or relocation.

6.6.4.5 Waste Management

Waste management activities will include:

- Hazardous waste will be managed handled, classified and disposed.
- Non hazardous substances will be disposed in the nearby landfill sites.
- Scrap and waste steel will be sold to recyclers
- It may be necessary to fence temporary salvage yards for security reasons, particularly where these are located close to public roads.

7. Public Participation Process

The public participation process commenced with a total of 5 newspaper advertisements in two widely distributed newspapers (The Namibian newspaper, Windhoek Observer and confidante newspaper) for three consecutive weeks as shown in Appendix A. Known interested and affected parties were notified directly via mail and fax. Posters were placed at the office of the Erongo Regional Council office around Karibib town and farm fences as well. Registered mail letters were also sent to the farm owners. Interested and affected parties that were notified directly include farmers, government departments, regional council, Namwater, Chamber of Mines and individuals that may be affected by the quarrying activities. No negative concerns were received so far, however should any interested and affected parties raise any concerns during the ongoing project phase, the Ministry of Environment, Forestry and Tourism will be immediately notified. The registered interested and affected are indicated in the table below.

8. Conclusion and recommendations

The proposed dimension stone quarry project will bring a major contribution to the socio-economic development of Karibib constituency and the entire country. The significance of the social impact on the residents of Karibib constituency was deemed to be highly positive. As the activities will provide employment for the local people and contribute to local & national economic development. It should be acknowledged that disturbance to the environment will be incurred, but that will be minimal and within legally acceptable levels. The site of the proposed mining activities already hosts other authorized dimension stone mining activities, therefore the natural setting of the area is accustomed to similar operations.

The EMP Consultants are confident that the potential negative impacts associated with the mining activities on site can continue to be mitigated by effectively implementing the recommended management action measures and their monitoring. This report should be viewed as a framework for integrating mitigation measures and applicable legal tools to ensure both compliance and sustainability. It is therefore very important that the proponent provides adequate support for human and financial resources, for the implementation of the proposed mitigations and effective environmental management during the planned mining activities.

It is further extremely important to include an Environmental Control Officer (ECO) on site during the relevant phases of the intended activity to ensure that all the mitigation measures discussed in this report and the EMP are enforced. Rehabilitation back to the natural state is a key component and will be undertaken in a phased manner as the mining activities progress. It is advised that the proponent strictly engages the guidelines outlined within the EMP with regards to the rehabilitation of the quarries once mining activities has ceased so as to restore the area to its near natural state and to reduce the associated negative environmental impacts.

Since no objection was received during the consultation period, the project is well received by both I&AP's as well as by stakeholders. It is also concluded that there are no sensitive cultural or heritage materials on the proposed sites and in case of any such material found at site

during construction phase, this should be handled as per the National Heritage Act. However, the scope is limited to assessing the potential impacts associated with the proposed development; therefore the effect on the surrounding environment is based on the current land use.

The proponent is recommended to implement an internal and external monitoring of the actions and management strategies developed during the mining duration. It is also required that a final Environmental Monitoring report be prepared by the Environmental Coordinator / Consultant and to be submitted to the regulators towards the end of the proposed quarry project. Moreover, the proponent should develop and implement a monitoring program that will fit into the overall company's Environmental Management Systems (EMS) as well as for any future EIA for possible quarrying projects. Negative impacts identified in the report can be satisfactorily mitigated through the full implementation of the mitigation actions recommended in this report. It is hereby recommended that proponent take all the necessary steps to implement all the recommendations of the EMP for the successful implementation and completion of the proposed quarry project for ML236 situated in the Karibib District, Erongo Region, Namibia.

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

9. References

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Appendix A: Registered IAP's

Name	Organization	Tel	Email
B. Korhs	Earth life Namibia	061-2022041	earthl@iway.na
C. Sisamu	Nampower	061-2052350	Calvin.Sisamu@nampower.com.na
C. Tubalike	MURD	061-2975062	ctubalike@murd.gov.na
Coleen Mannheim er	061-2022021	manfam@iafrica.com.na	
E de Paauw	Roads Authority - Specialised road Legislation, Advise & Compliance	061-2847027	dePaauwe@ra.org.na
E Muremi	Ministry of Health and Social Services Director Khomas Region	061-2035001	Elizabeth.Muremi@mhss.gov.na
E. Shivolo	Min. of M&E - Mining Commissioner	061-2848111	Erasmus.Shivolo@mme.gov.na
Esmerialda Strauss	CHIEF FORESTER National Botanical Research Institute (NBRI)	061-2022017	Esmerialda.Strauss@mawf.gov.na
F Kreitz	Namibian Environment and Wildlife Society - Media, website and newsletter	061-306450	Information@NEWS-Namibia.org;
F. Sikabongo	MET - Deputy Director of Directorate of Environmental Affairs	061-2842701	frederick.Sikabongo@mef.gov.na
Fransiska Nghitila	NWR-Environmental and Compliance Specialist	061-2857190	Fnghitila@nwr.com.na; fnghitila@gmail.com
Sonja Loots	Manager: Threatened Plants Programme, National Botanical Research Institute	061-2022014	Sonja.Loots@mawlr.gov.na sonja.loots.solo@gmail.com
MrNoroab	Karibib Town Council	067-331057	

Appendix B: Proof of Advertisements, Letters and Notices
Appendix C: CV of EAP