Excel Dynamic Solutions

ENVIRONMENTAL ASSESSMENT FOR THE RENEWAL AND SUBSEQUENT QUARRYING ACTIVITIES ON MININGCLAIMS NO. 65989, 65990, 65991, 65992, 66681 & 66682 LOCATED SOUTHWEST OF RIETOOG SETTLEMENT IN THE HARDAP REGION, NAMIBIA

EA REPORT – FINAL

ECC Application Reference: 002195

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EXECUTIVE SUMMARY

The Proponent, Mr. Nicolaas Carolus Januarie, holds 6 mineral rights under Mining Claims (MCs) No. 65989, 65990, 65991, 65992, 66681 & 66682. The mineral rights are granted by the Ministry on Mines and Energy (MME). The tenure of these licenses is from 25 February 2014 and expired on 24 February 2016, as per the information available on the Namibia Mining Cadastre Portal. Therefore, a renewal application is required for submission to MME. The areas covered by the MCs are prospective to Dimension stones and Industrial Minerals.

The MCs are located about 35.9 km southwest of the Rietoog Settlement, and cover a total surface area of 76.8576 hectares (ha). The localities of the MCs are shown in **Figure 1** (coordinates: -24.258^{0}S, 16.412^{0}E).

Project Description

The Proponent plans to submit an application for the renewal of the 6 claims with the MME. The objective of the planned renewal is to continue with the quarrying activities once the ECC is issued. The existing quarrying activities on the claims are for dimension stones, i.e., slate slabs and blocks and the production of final slate products. The aim of this project was to establish the impacts associated with the quarrying activities and make recommendations to MME for renewal of the claims.

Dimension stone is a term applied to naturally-occurring rock that may be cut, shaped or selected for use in blocks, slabs, sheets or other construction units of specific shapes or sizes. The target rock for quarrying on the claims is a sedimentary rock called slate.

The quarrying method proposed for this project is conventional truck and shovel quarrying. The mined material (slate is extracted manually and stripped from the earth in layers) will be loaded onto a truck to be transported to the processing point.

The process involved with quarrying and further processing of slate slabs into tiles consists of the following 5 processes (described hereunder):

- Extraction
- Sawing/ Cutting
- Docking
- Riving plus trimming
- Dressing

Since the project is already in its operational phase, there is no further infrastructure construction is anticipated. In other words, construction phase will be excluded in this environmental assessment study. The focus of the study was on the operational and maintenance and decommissioning phases.

The environmental scoping process identified sensitive environmental features that might be affected by the proposed small-scale quarrying activities. Invasive quarrying activities are expected to take place upon issuance of an ECC. Invasive activities involve rocks sampling and quarrying. Substantial deposits exist in the claims area. Additionally, the Proponent plans to conduct a staged quarrying approach as follows:

Operational and Maintenance (Small-scale quarrying)

This is the current phase during which the Proponent is extracting slate slabs and blocks from the quarrying pits and undertaking related activities on site. It is also the phase during which maintenance of the quarrying pits, equipment and machinery is done.

The overburden material is stored on the quarrying site, in a form of waste rock to the western side of the quarrying pit. The overburden is kept aside on site so that it can be used for backfilling, as part of the rehabilitation process

No explosives will be used during the quarrying phase. Other aspects of the small-scale quarrying include:

Accessibility to the Site

The nearest town to the tenement is Rehoboth which is approximately 80km from Windhoek via the B1 National road, which serves as the border of the electoral constituencies in the town. Rehoboth is serviced by road and rail network. From Rehoboth, Rietoog is accessed from the B1 road, through the C24 road, and on to the M47 route. The project areas are accessible further southwest of Rietoog Settlement through the C14 road. From the C14 road, the D855 road can be accessed towards the project site. Accessibility directly to the site can be made through a gravel tract which may be rocky and has poor condition, especially after heavy rainfall.

Material and Equipment

The required input for the small scale quarrying program in terms of vehicles and equipment include; one (4X4) vehicle, loading truck; bowsers; picks, shovels, chisels; compressor and generator; water pump and field storage.

Human Resources

Rietoog and Rehoboth are good sources for semi-skilled and unskilled workers. The small-scale quarrying work will require about 10 people to be on site, which include a site manager and sampling workers. When required to carry out maintenance, the responsibility personnel (employees) will be provided with appropriate Personal Protective Equipment (PPE).

Services and infrastructure

Water and Power Supply**:** The little rainfall at Rietoog has led to low water supply. Water is derived from privately owned boreholes as underground water. Moreover, the monthly water consumptions ±9000 litres, which includes water for drinking, sanitation, cooking, dust control, and washing equipment. Power required during operation phase will be provided by diesel-run generators.

Accommodation

The project will explicitly employ about 6 people, the aforementioned amount of people will include skilled and semi-skilled. Quarrying staff will be accommodated on the Proponent's farm, Ounoois. A campsite will be set up for the quarrying crew. Furthermore, quarrying activities will only take place during the day.

Timeframe

The planned small-scale quarrying will be done in stages on different parts of the farm. The small-scale quarrying is predicted to continue for about 10-years.

Waste Management

Depending on the amount generated, the slabs of waste will be sorted and some are re-used again and other waste will be collected on a monthly basis and taken to nearby landfill site. Ablution facilities will use chemical toilets and/or sealed septic tanks and the sewerage taken to the nearest storage facility, periodically. The disposal of wastewater as well as all other type of waste will be strictly controlled. Mineral waste (solid products of quarrying and mineral concentration to acquire the targeted commodity) and non-mineral waste (auxiliary materials that will support the quarrying phase) will occur onsite.

Decommissioning and Rehabilitation Phase

This phase is primarily reinforced through a decommissioning and rehabilitation plan which, among others, consist of safety, health, environmental and contingency aspects. The economic situation or unconvincing quarrying results may force the Proponent to eventually cease with the small-scale quarrying program. Therefore, it is of best practice for the Proponent to ensure that the removal of all platforms constructed; and waste materials generated on site throughout the

quarrying phase are environmentally disposed of. Necessary landscaping of quarrying areas will be undertaken upon completion of each phase of quarrying.

Project Alternatives

The conclusions weighed and considered for the quarrying programme are summarized below:

- **No-go alternative:** The "No-Go" alternative is the preference of not continuing with the activity, which characteristically implies a furtherance of the existing state of affairs. Should the proposed works of the prospecting and quarrying plan be discontinued, none of the possible impacts (positive and negative) identified would occur. In considering the proposed project, the 'no-go' option is not considered the preferred alternative.
- **Small-scale quarrying location:** The quarrying location is dependent on the geological setting, the economic geology, and the quarrying history of the MCs area. Therefore, finding an alternative location for the planned activities are not possible.
- **Small-scale quarrying Method:** Only open-cast quarrying activities are expected to take place.

Impact Identification

The potential positive and negative impacts that have been identified for the proposed establishment activities are as follows:

Positive impacts:

- The quarrying project has anticipated impacts on the enhancement of skills, poverty alleviation, rural development and development through income generation and employment creation
- Produce a trained workforce and small businesses that can service communities and may initiate related businesses
- Open up other investment opportunities.
- Contribution to regional economic development.
- Other infrastructure development related benefits

Negative impacts:

- Land degradation and possible destruction of faunal habitats as well as removal of vegetation that may be encountered within the target areas.
- Generation of dust from the quarrying activities and access gravel road
- Environmental pollution
- Visual impacts (scars) on landscape that will, because of low rainfall, remain so for a very long time if not rehabilitated.
- Occupational health and safety risks
- Archaeological impact
- Socio-economic and cultural issues, including sustainable development

Impacts Assessment and Mitigations

The key potential impacts associated with quarrying and decommissioning phases of the project were identified and assessed. In order to avoid and minimise (where impacts cannot be avoided) the identified project impacts, mitigation measures were recommended. The significant identified impacts for the project phases are summarized below. These impacts can be reduced or curtailed by implementing the mitigation measures given under the impact assessment chapter and also management actions plan provided in the Draft EMP.

- **Loss of Biodiversity:** Land degradation will be created due to digging activities and earthworks done to uncover the mineralized rock units, which could have a catastrophic impact on the biodiversity of the area, leading to habitat loss for a diversity of flora and fauna. Endemic species are most severely affected since even the slightest disruptions in their habitat can result in extinction. It is therefore important to identify and understand existing and minimize impact upon them with operational management guidelines. The Consultant advises the Proponent to avoid unnecessary removal of vegetation, in order to promote a balance between biodiversity and their operations. Under the current status quo, the impact can be considered to be of a medium significance rating. With the implementation of appropriate mitigation measures, the rating will significantly be reduced to low.
- **Generation of Dust (Air Quality):** During the project and construction phase, dust is generated by digging. Dust emissions from the small-scale quarrying activities can create a substantial environmental impact and compromise air quality in the area. The hot and dry environment and in some areas, a sandy nature of the substrate and low vegetation cover causes ambient fugitive dust levels. The medium significance of this impact can be

reduced by properly implementing mitigation measures. Therefore, the Consultant advises the Proponent to adhere and incorporate the South African National Standards (SANS) where the particulate matter (PM2.5) should not exceed 65 µg/m³.

- **Waste Generation:** Waste generation during the quarrying phase may cause land and water pollution on site if waste is not disposed in a responsible way. Precautions should be taken to prevent any spreading of refuse. Waste containers should be covered with mesh to prevent access by animals. With mitigation measures, the impact will be reduced from medium significance to low significance.
- **Visual Impact (Scars) on Landscape:** Small-scale quarrying activities leave scars on the landscape causing a visual impact. If the quarrying site is situated near tourists' routes, landscape scars may contrast surrounding landscapes and this can potentially cause visual nuisance to tourists. However, it is vital to note that throughout quarrying phase, landscape protection measures will need to be taken. Currently, the visual impact can be rated as medium and may be reduced to low significance upon effectively implementing the measures.
- **Potential Health and Safety Risks:** The small-scale quarrying activities on the MCs can pose health and safety risks to workers. Inappropriate handling of material and equipment may cause health and safety risks such as injuries to workers. The impact is probable and has a medium significance rating. However, with adequate mitigation measures, the impact rating will be reduced to low.
- **Surrounding Soils:** The MCs' site has very low vegetation coverage, therefore planned quarrying activity could potentially disturb the soil structure on the site, which will leave the already exposed site soils vulnerable to erosion resulting into creation of gullies. The impact can be rated as medium. However, with the implementation of mitigation measures, the impact will be reduced to a low impact.
- **Groundwater Impact:** The likely groundwater impact will be by pollutants generated from any spillage, plus the wastewater effluent discharge. The unmitigated scenario is assessed as medium impact, but with the recommended mitigation measures of the development of a functional water balance and improved monitoring the assessment reduces to low.

- **Archaeological Impact:** Historical resources may be impacted through unintentional destruction or damage during quarrying activities. There are has not been information provided about the known heritage or site of cultural values within the site or in the vicinity of the project area. Therefore, this impact can be rated medium, but upon implementation of the necessary measures, the impact will be reduced from medium to low.

Conclusions

The potential positive and negative impacts stemming from the proposed quarrying activities on the MCs were identified, assessed and mitigation measures made thereof. The mitigation measures and recommendations provided in this EIA report and the management action plans provided in the draft EMP, can be deemed sufficient to avoid and/or reduce (where impact avoidance is impossible) the risks to acceptable levels. The Consultant is therefore confident that these measures are sufficient and thus recommends that the Proponent be issued with the ECC to enable the quarrying of dimension stones and industrial minerals on the tenements. However, the ECC should be issued on a condition that the provided management measures and action plans are effectively implemented on site and monitored. Should the ECC be issued, the Proponent will be expected to be compliant with the ECC conditions as well as legal requirements governing the mineral quarrying and related activities.

Limitations

The Consultant warrants that the findings and conclusions contained herein were accomplished in accordance with the methodologies set forth in the Scope of Work and EMA, 2007. These methodologies are described as representing good customary practice for conducting an Environmental Impact Assessment of a property for the purpose of identifying recognized environmental conditions. There is a possibility that even with the proper application of these methodologies there may exist on the subject property conditions that could not be identified within the scope of the assessment or which were not reasonably identifiable from the available information. The Consultant believes that the information obtained from the record review and during the public consultation process concerning the subject property is reliable. However, the Consultant cannot and does not warrant or guarantee that the information provided by these other sources is accurate or complete. The conclusions and findings set forth in this report are strictly limited in time and scope to the date of the evaluations. No other warranties are implied or expressed.

Some of the information provided in this report is based upon personal interviews, community meetings and research of available documents, records, and maps held by the appropriate government and private agencies. This report is subject to the limitations of historical documentation, availability, and accuracy of pertinent records and the personal recollections of those persons contacted.

COVID-19 Influences

Covid -19 has changed the way the world thinks, act and does business. The pandemic has forced a comprehensive review of business practices, a higher level of engagement with technology to offset the constraints due to social distancing, restrictive travel, and a focus on social responsibility. The constraints had to change very little in the way we operate and provide public consultation services.

These platforms depended on included site visit, emails, registered mails, notices, newspaper adverts, and telephonic communication.

The Consultant practices include but are not limited to:

- Social distancing will be strictly enforced when on project site(s)
- Facemasks worn by members during site assessment visits

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LIST OF ABBREVIATIONS

Abbreviation	Description
AMSL	Above Mean Sea Level
BID	Background Information Document
CV	Curriculum Vitae
DEA	Department of Environmental Affairs
EA	Environmental Assessment
EAP	Environmental Assessment Practitioner

Abbreviation	Description
ECC	Environmental Clearance Certificate
EDS	Excel Dynamic Solutions
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental Management Plan
GG	Government Gazette
GN	Government Notice
IFC	International Finance Corporation
I&APs	Interested and Affected Parties
KMPH	Kilometre Per Hour
MCs	Mining Claims
MEFT	Ministry of Environment, Forestry and Tourism
MME	Ministry of Mines and Energy
Reg	Regulation
S	Section
TOR	Terms of Reference

Key Terms

Alternative	A possible course of action, in place of another that would meet the same purpose and need of the proposal.
Baseline	Work done to collect and interpret information on the condition/trends of the existing environment.
Biophysical	That part of the environment that does not originate with human activities (e.g., biological, physical and chemical processes).

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

Mitigation	The purposeful implementation of decisions or activities that are designed to reduce the undesirable impacts of a proposed action on the affected environment.
Monitoring	Activity involving repeated observation, according to a pre-determined schedule, of one or more elements of the environment to detect their characteristics (status and trends).
Proponent	Organization (private or public sector) or individual intending to implement a development proposal.
Public Consultation/Involvement	A range of techniques that can be used to inform, consult or interact with stakeholders affected by the proposed activities.
Scoping	An early and open activity to identify the impacts that are most likely to be significant and require specialized investigation during the EIA work. Can, also be used to identify alternative project designs/sites to be assessed, obtain local knowledge of site and surroundings and prepare a plan for public involvement. The results of scoping are frequently used to prepare a Terms of Reference for the specialized input into full EIA.
Terms of Reference (ToR)	Written requirements governing full EIA input and implementation, consultations to be held, data to be produced and form/contents of the EIA report. Often produced as an output from scoping.

1 INTRODUCTION

1.1 Project Background

Mr. Nicolaas Carolus Januarie (hereinafter referred to as the *Proponent*), the holder of the Mining Claims (MCs) 65989, 65990, 65991, 65992, 66681 & 66682, granted by the Ministry of Mines and Energy (MME), intends to acquire an ECC to be able to conduct small-scale quarrying activities on the MCs (upon the renewal thereof). The Proponent focuses on acquisition, quarrying and development of mineral properties. The locality map of the licenses where the small-scale quarrying activities will be undertaken is shown in **Figure 1**.

In terms of Section 27 (1) of the Environmental Management Act (EMA), No. 7 of 2007, and in line with Sections 32 – 37 of the EMA as gazed in 2012, the proposed small-scale quarrying activities form part of the listed activities that may not be conducted without an ECC from the Department of Environmental Affairs (DEA), MEFT being obtained. The relevant listed activities as per EIA regulations are:

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

Subsequently, the Proponent appointed Excel Dynamic Solutions (Pty) Ltd, an independent team of Environmental Consultants to conduct the required EA process and submit the ECC application to the Ministry of Environment, Forestry and Tourism (MEFT) and MME on their behalf. The draft Environmental Management Plan (EMP) as required for this project under section 48 of the Prospecting and Mining Act, 1992; will be used by the Proponent and their employees to guide them throughout the operations, to ensure that the impacts on the environment are avoided or limited if they cannot be avoided completely.

1.2 Terms of Reference and Scope of Works

There were no formal Terms of Reference (ToR) provided to the Consultant by the Proponent. The consultant, instead, relied on the requirements of the Environmental Management Act (No. 7 of 2007) (EMA) and its Environmental Impact Assessment (EIA) Regulations (GN. No. 30 of 2012) to conduct the study.

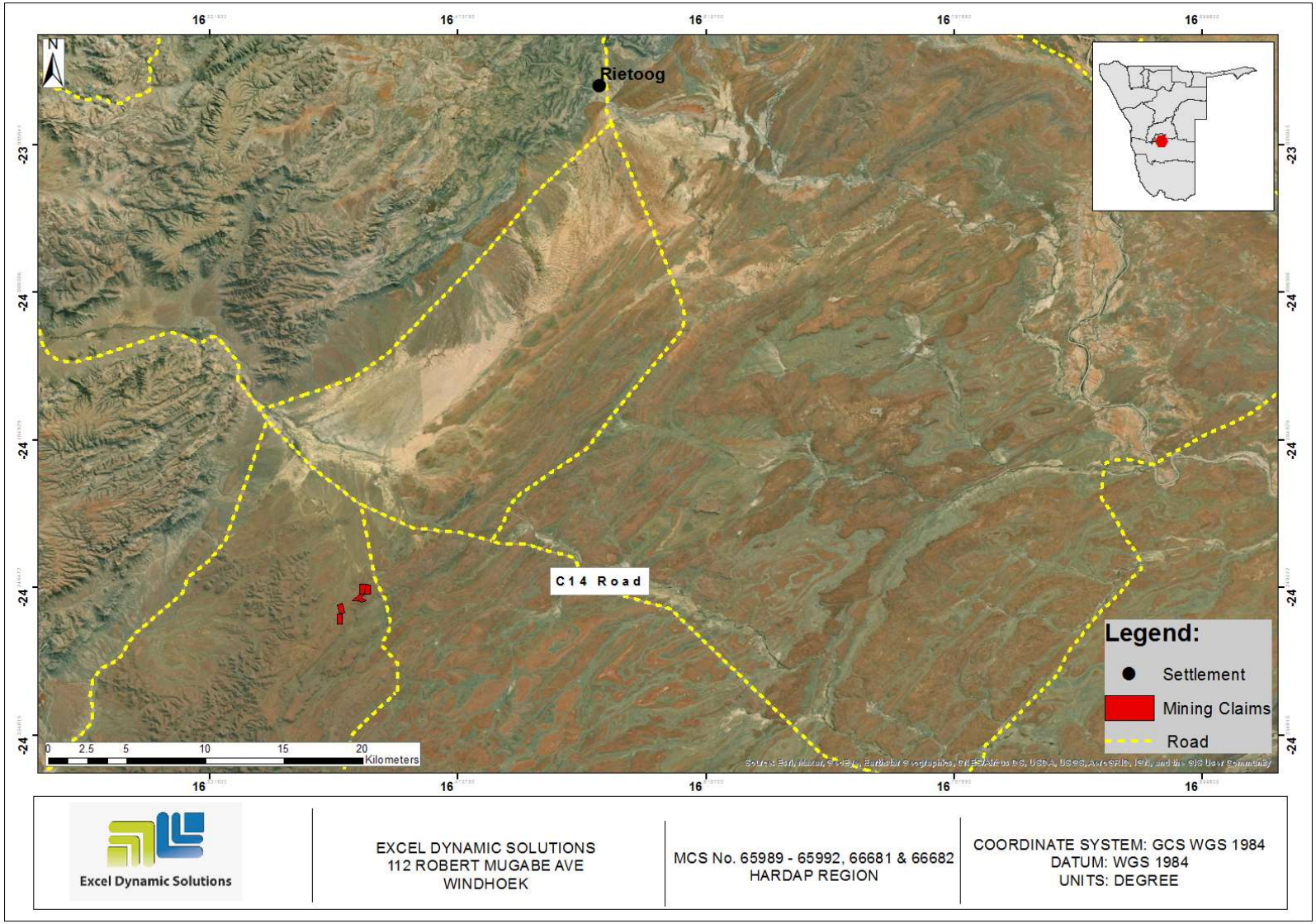


Figure 1: Location of MCs no. 65989-65992, 66681 & 66682 located southwest of Rietoog, in the Hardap Region

1.3 Appointed Environmental Assessment Practitioner

In order to satisfy the requirements of the EMA and its 2012 EIA Regulations, the Proponent appointed Excel Dynamic Solutions (Pty) Ltd (Consultant or the Environmental Assessment Practitioner hereafter), an independent consulting company, to conduct the required EA process on his (Proponent's) behalf. The findings of the EA process are incorporated into this report and the draft EMP - (**Appendix B**) will be submitted as part of an application for an ECC to the Environmental Commissioner at the DEA, MEFT.

The EIA project is headed by Mr. Nerson Tjelos, a qualified and experienced Geoscientist and experienced EAP. The consultation process and reporting was done by Ms. Althea C. Brandt with support from Ms. Rose Mtuleni. Mr. Nerson Tjelos contributed to the report writing and review. The CV for Mr. Tjelos is presented in **Appendix C.**

1.4 Details of the Project Proponent

The details of the Proponent are presented in **Table 1** below.

Table 1: Proponent contact details and purpose of the required ECC

Full name of Proponent	Physical Address and Contact Number	Postal Address	ECC Application for:
Mr. Nicolaas Carolus Januarie	5911 Ext 23 Swakopmund Telephone: +264 81 145 5084 januariesam75@gmail.com / omssam@afol.com.na	P.O. Box 7445, Swakopmund	Mining Claims (MCs) No. 65989-65992, 66681 & 66682 located southwest of Rietoog near Rehoboth in the Hardap Region, Namibia

1.5 The Need for the Proposed Project

Quarrying is first and foremost a source of mineral commodities that many countries find essential for maintaining and improving their standards of living. Mining contributes to 25% of the Namibia's income (DBO, 2017). It is one of the largest contributors to the Namibian economy. Small-scale quarrying contributes to poverty alleviation through employment creation, income earning opportunities, and sustaining local businesses by means of purchases done at local and nearby towns (Nyambe & Amunkete, 2009). Small-scale quarrying plays a pivotal role in alleviating poverty in the developing world, and contributes significantly to national revenues and foreign exchange earnings. The Proponent's small-scale quarrying programme presents a valuable opportunity to contribute to infrastructure development and the construction industry which are a key component in the development of Namibia and the nation's economy. Small-scale quarrying

activities provide employment, dividends, and taxes that pay for social infrastructure. The mining sector yields foreign exchange and accounts for a significant portion of gross domestic product. In addition, the industry produces a trained workforce and small businesses that can service communities and may initiate related businesses. A number of associated activities are fostered, such as manufacturing of quarrying and equipment, provision of engineering and environment services. Successful small-scale quarrying work can lead to quarrying activities on the MCs, which would feed into the national development plans such as NDP5, vision 2030. Moreover, the project is expected to generate full time medium to long term direct employment for at least 6 people.

Globally, the construction sector accounts for over 80 percent of world consumption of dimension stone, with the funerary monumental industry accounting for 15 percent, and various special applications for around 3 percent (SAMI, 2005).

Given the fact that this activity creates employment to the local community and contributes to the country's GDP, this justifies the need for small-scale quarrying work on the MCs to enable future quarrying activities.

2. PROJECT DESCRIPTION: PROPOSED QUARRYING ACTIVITIES

The descriptions of the intended continuation of the small-scale quarrying activities to be undertaken are presented below (**Section 2.1, 2.2 and 2.3**). The existing quarrying activities on the claims are for dimension stones, i.e., slate slabs and blocks and the production of final slate products. Since the project is already in its operational phase, there is no further infrastructure construction is anticipated. In other words, construction phase will be excluded in this environmental assessment study. The focus of the study was on the operational and maintenance and decommissioning phases

2.1 Pre-Development Phase (Prospecting)

The prospecting phase includes reconnaissance and old quarry operations mapping to identify prospective lithostratigraphic packages. The target rock type is a sedimentary rock called slate. Slate is a fine-grained, homogeneous, sedimentary rock that has been minimally metamorphosed in layers. Due to its two lines of breakability, the cleavage and the grain slate can be split it into thin sheets and used in construction as slate flooring, and for constructing bedded slate walls making it a very popular material. Slates vary in sizes and colours. The key characteristics of slate are:

- Slate is characterized by a sub parallel orientation, which imparts a strong parallel cleavage to the rock, which allows the slate rock to be split into thin but tough sheets of slate.
- Slate is compact and has a moderate hardness and lesser homogeneity
- It has a fine to medium grained surface texture
- It has an excellent shining property
- Slate is also very durable and a resistant natural rock

Prospecting work conducted so far and, in the future, will have no physical disturbance.

2.2 Operational and Maintenance (Small-scale quarrying)

This is the current phase during which the Proponent is extracting slate slabs and blocks from the quarrying pits and undertaking related activities on site. It is also the phase during which maintenance of the quarrying pits, equipment and machinery is done

The quarrying method used for this project is conventional truck and shovel quarrying. The mined material (slate is extracted manually and stripped from the earth in layers) will be loaded onto a truck to be transported to the processing point.

The mining method employed for this project is conventional truck and shovel extraction. The mined materials (slate is extracted manually and stripped from the earth in layers) are loaded onto a truck to be transported to the processing point. No explosives will be used during the quarrying phase. The overburden material is stored on the quarrying site, in a form of waste rock for backfilling, as part of the rehabilitation process.

The process involved with quarrying and further processing of slate slabs into tiles consists of the following 5 processes (described hereunder):

- Extraction: The extraction of slate slabs involves the mining or 'cutting' of large slabs from the earth and then 'splitting' the slabs. Using a small truck, the slate is then transported to the sawing process.
- Sawing/ Cutting: After the slabs have been split it will be then cut into to size by a saw across the grain into set sizes
- Docking: Docking the slate is the process of reducing the original large size slate to a thickness ready to be rived
- Riving plus trimming: splitting the sections, again by hand, with mallet and broad bladed chisel into four slices each of the finished thickness for use
- Dressing: Having made the slates the correct thickness, dressing is the process that cuts or trims the slate into the precise shape required

A 10-year small-scale quarrying period is predicted. Other aspects of the small-scale quarrying activities include:

2.2.1 Accessibility to Site

The nearest town to the tenement is Rehoboth which is approximately 80km from Windhoek via the B1 National road, which serves as the border of the electoral constituencies in the town. Rehoboth is serviced by road and rail network. From Rehoboth, Rietoog is accessed from the B1 road, through the C24 road, and on to the M47 route. The project areas are accessible further southwest of Rietoog Settlement through the C14 road. From the C14 road, the D855 road can be accessed towards the project site. Accessibility directly to the site can be made through a gravel tract which may be rocky and has a poor condition, especially after heavy rainfall. In terms of accessibility from other parts of the world, Namibia is serviced by an international Airport located at Windhoek with daily flights to Europe and South Africa. Regionally, the paved all weather Trans-Caprivi Highway road links Walvis Bay to the countries of Botswana, Zambia and Zimbabwe, as well as the Democratic Republic of Congo. In addition, the Trans-Kalahari Highway links Walvis Bay with South Africa's Gauteng industrial heartland via Botswana. A harbour

(Namport) is found in Walvis Bay that gives a platform for samples and mined materials to be offloaded or loaded onto transnational shipping lines.

2.2.2 Material and Equipment

The required input for the small-scale quarrying program in terms of vehicles and equipment include; one (4X4) vehicle, bowsers, picks, shovels, chisels; compressor and generator, water pump and field storage.

2.2.3 Human Resources

Rietoog and Rehoboth are good sources for semi-skilled and unskilled workers. The small-scale quarrying work will require about 6 people to be on site, which include a site manager and sampling workers. When required to carry out maintenance, the responsibility personnel (employees) will be provided with appropriate Personal Protective Equipment (PPE).

2.2.4 Services and infrastructure

Water and Power Supply: The little rainfall at Rietoog has led to low water supply. Water is derived from privately owned boreholes as underground water. The monthly water consumptions ±9000 litres, which includes water for drinking, sanitation, cooking, dust control, and washing equipment.

Power supply: Power required during operation phase will be provided by diesel-run generators.

2.2.5 Accommodation

The project will explicitly employ at least 6 people, including skilled and semi-skilled workers. Quarrying staff will be accommodated on the proponent's farm, Ounoois (MCs' site) near Rietoog. A campsite will be set up on the farm for the quarrying crew. Furthermore, quarrying activities will only take place during the day.

2.2.6 Timeframe

The planned small-scale quarrying surveys will be done in stages on different parts of the properties. A 10-year small-scale quarrying period is projected.

2.2.7 Waste Management

Depending on the amount generated, waste will be sorted and collected on a monthly basis and the waste slabs which cannot be re-used are taken to nearby landfill site. Ablution facilities will use chemical toilets and/or sealed septic tanks and the sewerage taken to the nearest storage facility, periodically. The disposal of wastewater as well as all other type of waste will be strictly controlled. Mineral waste (solid products of quarrying and mineral concentration to acquire the

targeted commodity) and non-mineral waste (auxiliary materials that will support the quarrying phase) will occur onsite.

The following types of waste will occur onsite:

Quarrying Waste: This will consist of solid products of quarrying produced to acquire the targeted materials. The waste will potentially be produced throughout the project phase. This waste will be stripped and dumped in allocated areas in accordance to the EMP.

Non-mineral Waste: Non-mineral waste during the small-scale quarrying phase will consist primarily of auxiliary materials that will support the operational phase. This includes but is not limited to items such as empty containers, plastic and other domestic waste. These wastes will be collected and sorted and taken to the dumpsite monthly.

2.3 Decommissioning and Rehabilitation Phase

Quarrying activity on MCs 65989-65992, 66681 & 66682 will eventually come to an end. The economic situation or an unconvincing quarrying result may force the Proponent to eventually cease with the quarrying activity. Decommissioning and rehabilitation are primarily performed through a decommissioning and rehabilitation plan which, among others, consist of safety, health, environmental and contingency aspects. Therefore, it is of best practice for the Proponent to ensure that the removal of all platforms including the removal of camp sites, concrete plinths and waste materials generated on site throughout the quarrying phase are environmentally disposed of. During the operational phase and before rehabilitation, the Proponent will need to put site rehabilitation measures in place. Where necessary, stockpiling of top soil for rehabilitation at a later stage will be undertaken. Necessary rehabilitation of the small-scale quarrying areas will be undertaken upon completion of each phase of quarrying.

3. PROJECT ALTERNATIVES

Alternatives are defined as: "*different means of meeting the general purpose and requirements of the activity*" (Environmental Management Act (2007) of Namibia (and its regulations (2012))). This chapter will highlight the different ways in which the project can be undertaken and to identify the alternatives that will be the most practical but least damaging to the environment.

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

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

The alternatives considered for the proposed development are discussed in the following subchapters.

3.1 Types of Alternatives Considered

3.1.1 The "No-go" Alternative

The "No-Go" alternative is the preference of not continuing with the activity, which characteristically implies a furtherance of the existing state of affairs. Therefore, should the proposed works of the small-scale quarrying plan be discontinued, none of the possible impacts (positive and negative) identified would occur. Furthermore, local people to be hired for quarrying work will be left jobless and the Proponent would not be able to discover and define the targeted resource for possible larger scale quarrying and to contribute to the country's economy through revenue and license royalty payments. If the proposed project is to be discontinued, the current land use for the proposed site will remain unchanged. In considering the proposed project, the 'no-go' option is not considered the preferred alternative.

3.1.2 Small-scale Quarrying Location

The location intended for small-scale quarrying activities are dependent on the geological setting and economic geology of the area. Therefore, finding an alternative location for the planned quarrying activities are not possible. In other words, the target mineralization is area specific, which means quarrying targets are primarily determined by the geology (host rocks) and the tectonic environment of the site (ore forming mechanism).

3.1.3 Small-scale Quarrying Method

Invasive small-scale quarrying activities are expected to take place upon issuance of an ECC. Furthermore, if an economically viable discovery is made, the project will proceed to the quarrying phase. For this intended project the Proponent will be relying on pick-and-shovel methods for quarrying.

3.2 Conclusion on Alternatives

The conclusions weighed and considered above are summarized below:

- **No-go alternative:** Should the proposed small-scale quarrying works on the MCs (65989-65992, 66681 & 66682) be discontinued, none of the potential impacts identified would occur. Moreover, the local people to be hired by the project will be left without employment and the Proponent would not be able discover and define the targeted commodity for possible future quarrying activities to generate an income and contribute to the country's GDP through revenue and license royalty payments. In considering the proposed project, the 'no-go' option is not considered the preferred alternative.
- **Small-scale quarrying location:** Finding an alternative location for the planned small-scale quarrying activities are not possible (refer to section 3.1.2).
- **Small-scale quarrying Methods:** Only invasive small-scale quarrying activities are expected to take place. If an economically viable discovery is made, the project will proceed to full quarrying phase.

4 LEGAL FRAMEWORK: LEGISLATION, POLICIES AND GUIDELINES

A review of the applicable and relevant Namibian legislation, policies and guidelines to the proposed development are given in this chapter. This review serves to inform the project Proponent, Interested and Affected Parties and the decision makers at the DEA of the requirements and expectations, as laid out in terms of these instruments, to be fulfilled in order to establish the proposed prospecting and quarrying activities.

The Environmental Management Act (No. 7 of 2007)

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

The EMA has stipulated requirements to complete the required documentation in order to obtain an ECC for permission to undertake certain listed activities. These activities are listed under the following Regulations:

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

The legal obligations that are relevant to the proposed activities of MCs 65989-65992, 66681 & 66682 are presented in **Table 2**.

Table 2: Applicable local, national and international standards, policies and guidelines governing the proposed development

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Environmental Management Act EMA (No 7 of 2007)	Requires that projects with significant environmental impacts are subject to an environmental assessment process (Section 27). It details the principles which are to guide all EAs.	The EMA and its regulations should inform and guide this EA process.
Environmental Impact Assessment (EIA) Regulations GN 28-30 (GG 4878)	Details requirements for public consultation within a given environmental assessment process (GN 30 S21).	

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
	Details the requirements for what should be included in a Scoping Report (GN 30 S8) and an Assessment Report (GN 30 S15).	
The Constitution of the Republic of Namibia, 1990 as amended	The Constitution of the Republic of Namibia (1990 as amended) addresses matters relating to environmental protection and sustainable development. Article 91(c) defines the functions of the Ombudsman to include: *"…the duty to investigate complaints concerning the over-utilisation of living natural resources, the irrational exploitation of non-renewable resources, the degradation and destruction of ecosystems and failure to protect the beauty and character of Namibia…"* *Article 95(l) commits the state to actively promoting and maintaining the welfare of the people by adopting policies aimed at the:* *"…Natural resources situated in the soil and on the subsoil, the internal waters, in the sea, in the continental shelf, and in the exclusive economic zone are property of the State."*	By implementing the environmental management plan, the establishment will be in conformant to the constitution in terms of environmental management and sustainability. Ecological sustainability will be the main priority for the proposed development.
The Regional Councils Act (No. 22 of 1992)	This Act sets out the conditions under which Regional Councils must be elected and administer each delineated region. From a land use and project planning point of view, their duties include, as described in section 28 "to undertake the planning of the development of the region for which it has been established with a view to physical, social and economic characteristics, urbanisation patterns, natural resources, economic development potential, infrastructure, land utilisation pattern and sensitivity of the natural environment. The main objective of this Act is to initiate, supervise, manage and evaluate development.	The relevant Regional Councils are considered to be I&APs and must be consulted during the Environmental Assessment (EA) process. The project site falls under the Hardap Regional Council; therefore, they should be consulted.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Local Authorities Act No. 23 of 1992	To provide for the determination, for purposes of local government, of local authority councils; the establishment of such local authority councils; and to define the powers, duties and functions of local authority councils; and to provide for incidental matters.	The Rehoboth Town Council is the responsible Local Authorities of the area therefore they should be consulted.
Water Act 54 of 1956	The Water Resources Management Act 11 of 2013 is presently without regulations; therefore, the Water Act No. 54 of 1956 is still in force: • Prohibits the pollution of water and implements the principle that a person disposing of effluent or waste has a duly of care to prevent pollution (S3 (k)). • Provides for control and protection of groundwater (S66 (1), (d (ii)). Liability of clean-up costs after closure/abandonment of an activity (S3 (l)).	The protection (both quality and quantity/abstraction) of water resources should be a priority.
Water Resources Management Act (No 11 of 2013)	The Act provides for the management, protection, development, use and conservation of water resources; and provides for the regulation and monitoring of water services and to provide for incidental matters. The objects of this Act are to: Ensure that the water resources of Namibia are managed, developed, used, conserved and protected in a manner consistent with, or conducive to, the fundamental principles set out in Section 66 - protection of aquifers, Subsection 1 (d) (iii) provide for preventing the contamination of the aquifer and water pollution control (Section 68).	

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Minerals (Prospecting and Mining Act) No. 33 of 1992	The Prospecting and Mining Act aims to provide for the reconnaissance, prospecting and quarrying for, and disposal of, and the exercise of control over, minerals in Namibia; and to provide for matters incidental thereto. Section 52 requires mineral license holders to enter into a written agreement with affected landowners before exercising rights conferred upon the license holder.	The Proponent should enter into a written agreement with landowners/affected parties before carrying out quarrying as per the Section 52 of the Minerals (Prospecting and Mining) Act No. 33 of 1992 and Section 2.2.3 of the Draft Minerals Policy of Namibia: *Section 52 (1) The holder of mineral licence shall not exercise any rights conferred upon such holder by this Act or under any terms and conditions of such mineral licence –* *(a) In, on or under any and until such time as such holder has entered into an agreement in writing with the owner of such land containing terms and conditions relating to the payment of compensation, or the owner of such land has in writing waked any right to such compensation and has submitted a copy of such agreement or waiver to the Commissioner.* *Section 2.2.3 of the Draft Minerals Policy of Namibia states that the Licence Holder and/or mineral explorers currently have to negotiate a contract with landowners to gain access for or quarrying purposes.*

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
National Heritage Act No. 27 of 2004	To provide for the protection and conservation of places and objects of heritage significance and the registration of such places and objects; to establish a National Heritage Council; to establish a National Heritage Register; and to provide for incidental matters.	The Proponent should ensure compliance with this Acts' requirement. The necessary management measures and related permitting requirements must be taken. This done by consulting with the National Heritage Council of Namibia.
The National Monuments Act (No. 28 of 1969)	The Act enables the proclamation of national monuments and protects archaeological sites.	
Soil Conservation Act (No 76 of 1969)	The Act makes provision for the prevention and control of soil erosion and the protection, improvement and conservation of soil, vegetation and water supply sources and resources, through directives declared by the Minister.	Duty of care must be applied to soil conservation and management measures must be included in the EMP.
Public Health Act (No. 36 of 1919)	Section 119 states that "no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health."	The Proponent and all its employees should ensure compliance with the provisions of these legal instruments.
Health and Safety Regulations GN 156/1997 (GG 1617)	Details various requirements regarding health and safety of labourers.	
Road Traffic and Transport Act, No. 22 of 1999	The Act provides for the establishment of the Transportation Commission of Namibia; for the control of traffic on public roads, the licensing of drivers, the registration and licensing of vehicles, the control and regulation of road transport across Namibia's borders; and for matters incidental thereto. Should the Proponent wish to undertake activities involving road transportation or access onto existing roads, the relevant permits will be required.	Mitigation measures should be provided for, if the roads and traffic impact cannot be avoided. The relevant permits must therefore be applied for.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Labour Act (No. 6 of 1992)	Ministry of Labour (MOL) is aimed at ensuring harmonious labour relations through promoting social justice, occupational health and safety and enhanced labour market services for the benefit of all Namibians. This ministry insures effective implementation of the Labour Act no. 6 of 1992.	The Proponent should ensure that the prospecting and quarrying activities do not compromise the safety and welfare of workers.
United Nation Convention to Combat Desertification, 1992	The convention objective is to forge a global partnership to reverse and prevent desertification/land degradation and to mitigate the effects of drought in affected areas in order to support poverty reduction and environmental sustainability	

Relevant international Treaties and Protocols ratified by the Namibian Government

- Convention on International Trade and Endangered Species of Wild Fauna and Flora (CITES) (1973).
- Convention on Biological Diversity (1992).
- World Heritage Convention (1972).
- United Nations Convention to Combat Desertification (1994).

5 ENVIRONMENTAL BASELINE

The proposed small-scale quarrying programme will be undertaken in specific environmental and social conditions. The pre-project conditions of the environment will aid in laying down background "information" of what was before and what would be after the project. This also helps the EAP in identifying the sensitive environmental features that may need to be protected through the recommendation and effective implementation of mitigation measures. The summary of selected biophysical and social baseline information pertaining to the prospecting area is given below. The baseline information presented below has been sourced from different sources including similar studies conducted in the region.

5.1 Climate

The climate data for Tsumis are used because it is the closest active weather station to the MCs.

5.1.1 Temperature

The daytime temperatures range between 25 °C to 28 °C from October to January, the hottest months, and can drop below 12 °C between June and August. July has the lowest average temperature of the year (**Figure 2**).

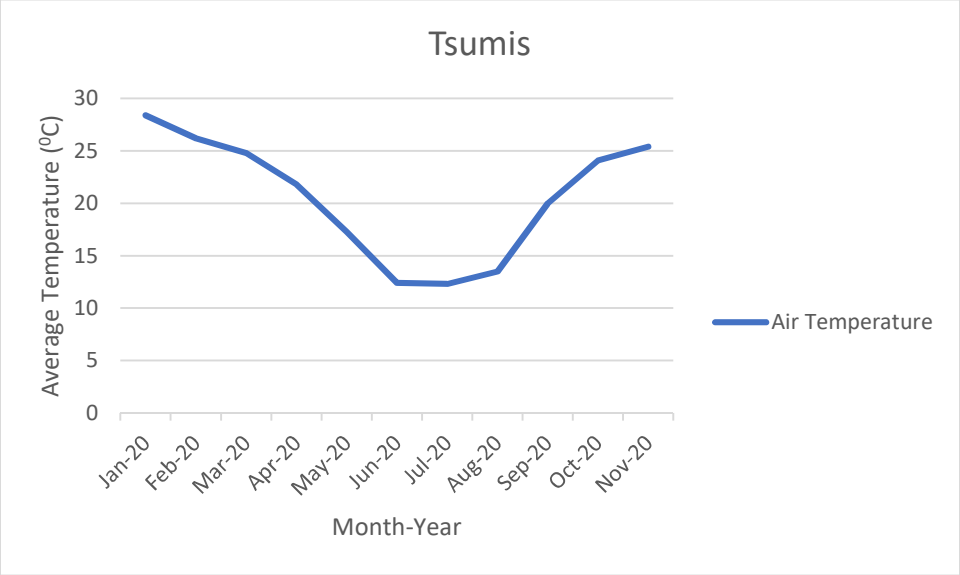


Figure 2: **A graph showing temperature patterns from Jan 2020 – Nov 2020 in Tsumis, Hardap Region**

5.1.2 Rainfall

Hardap Region, like the rest of Namibia, is an arid to semi-arid area. The driest time is between May and August with 0 mm of rainfall. With an average of 41 mm, the most precipitation falls in

February. Various rivers in the area flow only after heavy rains, necessitating some curtailment of quarrying activities during this time of year as indicated in **Figure 3**.

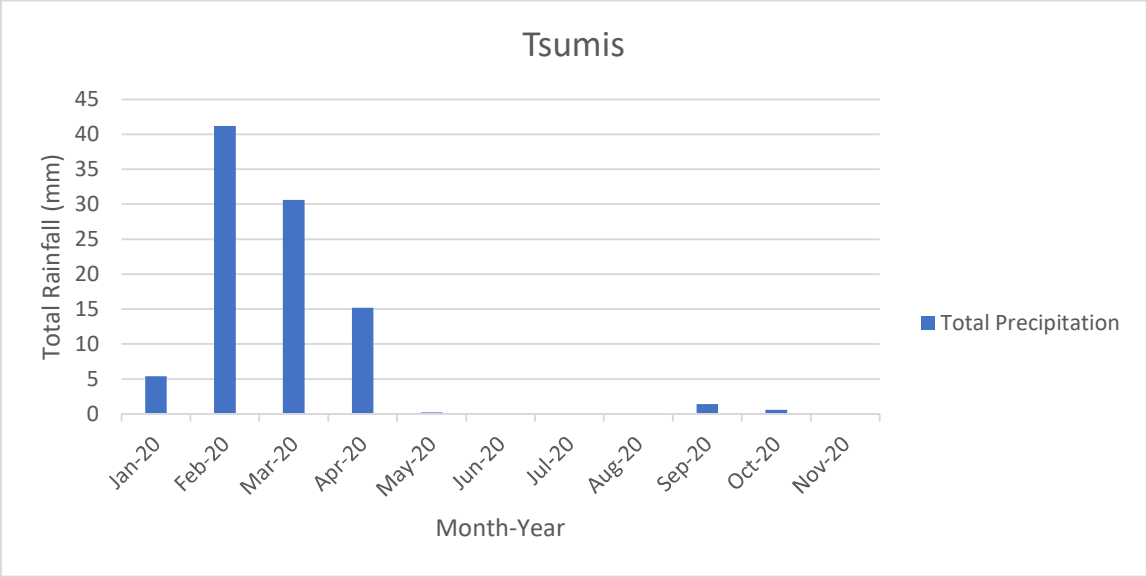


Figure 3: A graph showing rainfall patterns from Jan 2020 – Nov 2020 in Tsumis, Hardap Region

5.1.3 Wind

Tsumis and the surrounding area has predominantly easterly wind. Southerly, easterly and northerly airflow is common. The highest wind speeds are attained in November as shown in **figure 4**.

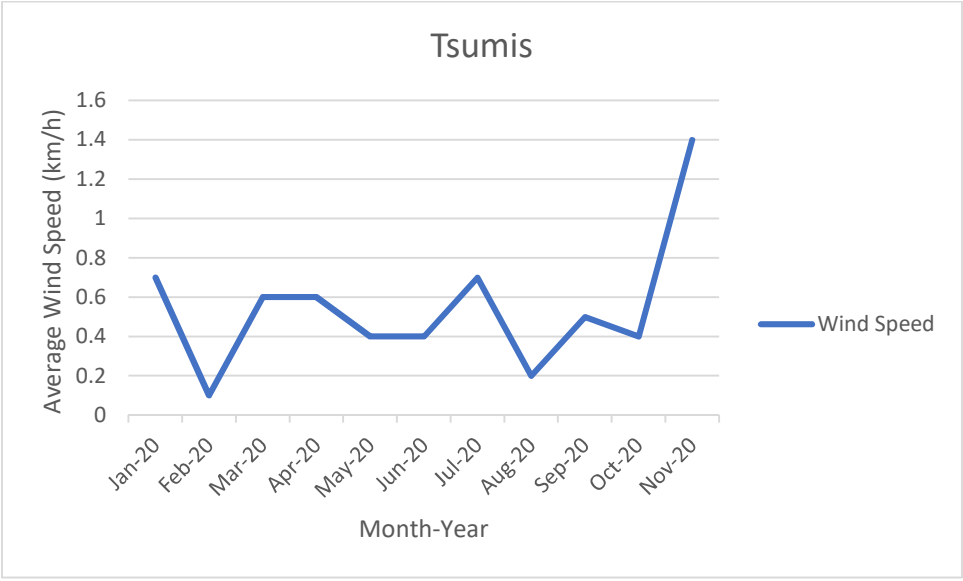


Figure 4: A graph showing wind patterns from Jan 2020 – Nov 2020 in Tsumis, Hardap Region

5.2 Topography and Drainage

Much of Namibia consists of a rather wide and flat plateau. The highest points in Namibia are the Brandberg and the Moltkeblick in the Auas Mountains a few kilometers south of Windhoek at 2, 759 m above sea level and 2,479 m above sea level, respectively (Mendelsohn et al, 2002). The MCs lie mainly in the Hardap Region which is characterized by a Nama-karoo basin landscape consisting of a flat lying plateau area underlain by Nama and Karoo sediments. Locally developed karst in Nama limestones and on surficial Calcrete; dolomite sills locally weather rounded boulders. **Figure 5** below shows the elevation with respect to the MCs and **Figure 6** shows the elevation cross section of Rietoog. In **Figure 7** a map of the hydrology is given showing the water and drainage system.

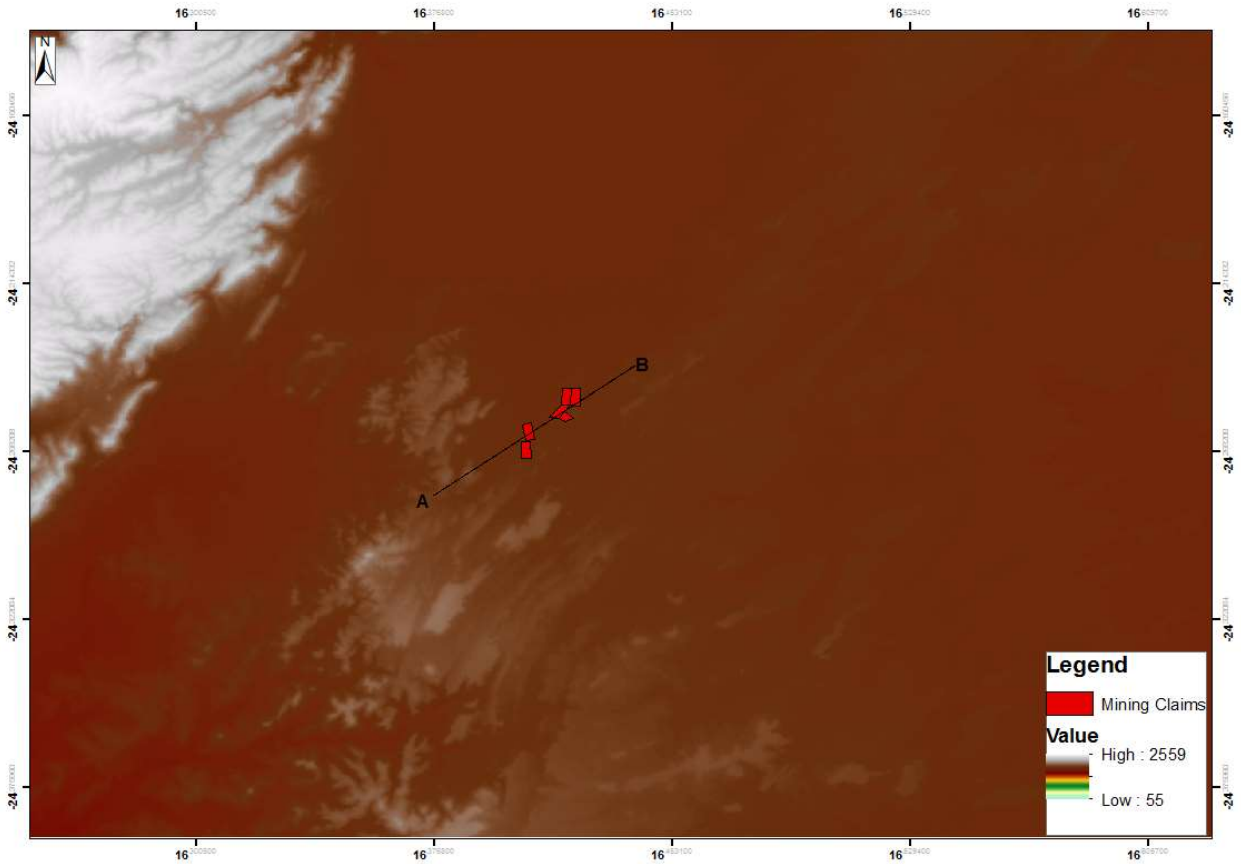


Figure 5: Elevation Model

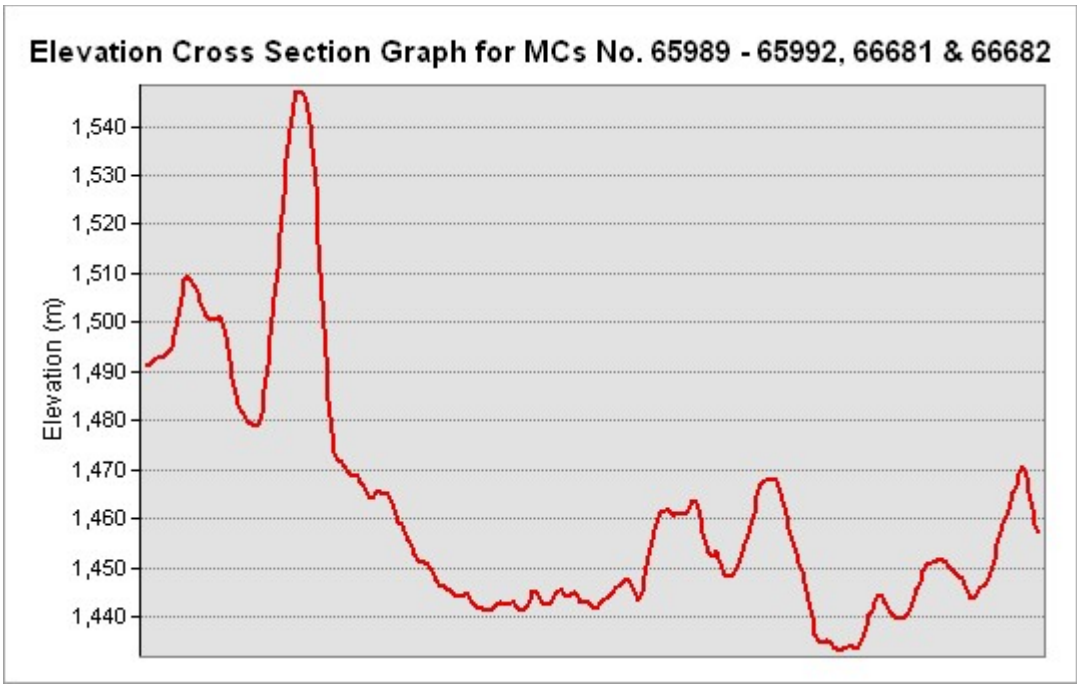


Figure 6: Cross section Elevation of Rietoog

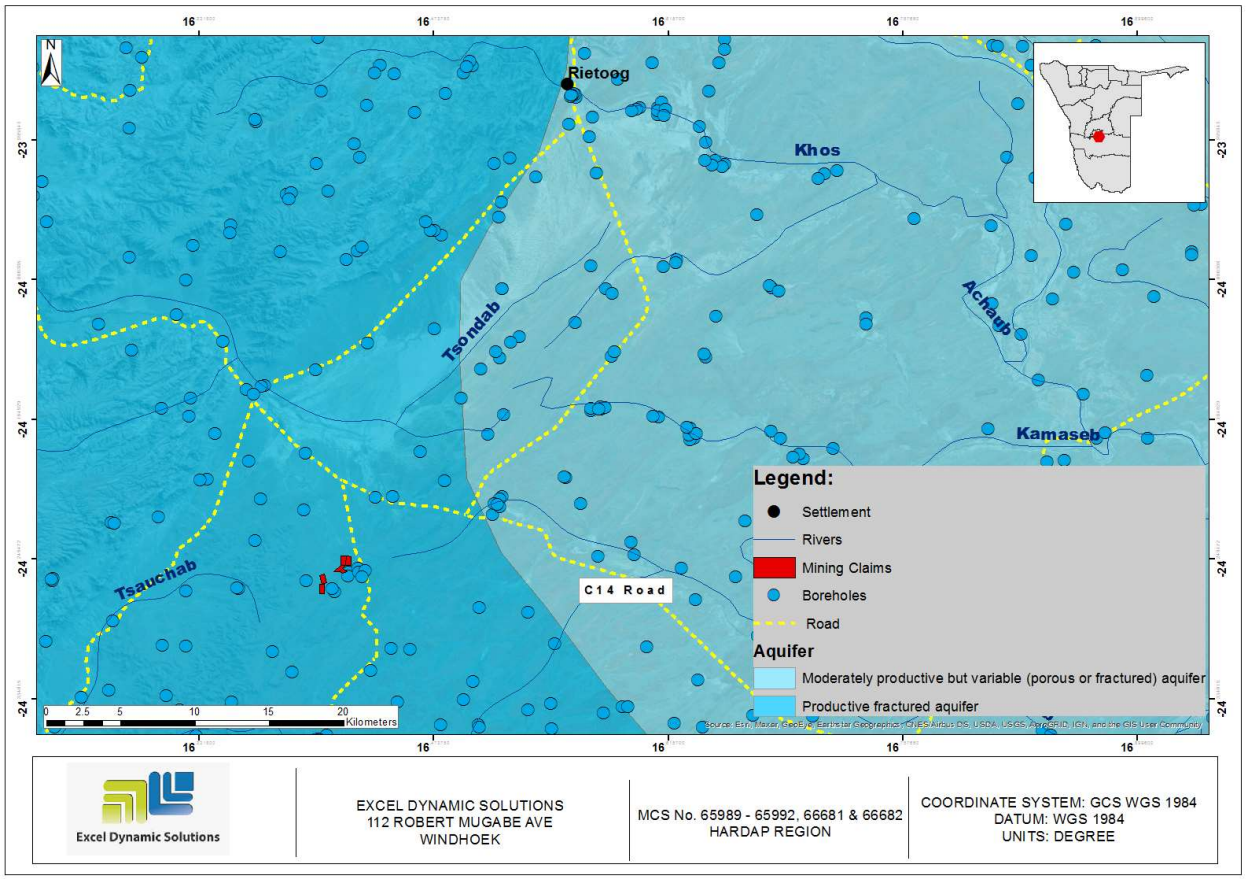


Figure 7: Hydrology Map of the project area

Potential contamination and alteration of surface and groundwater will require close monitoring. This will include the setting up monitoring stations at an early stage to designate possible sources of contamination and possible flow charges of the rivers. Moreover, the quarrying activities have the potential to affect the quantity and quality of surface and groundwater downstream. Therefore, one of the tools desirable, in order to attain the aim of surface and groundwater protection, is an effective water quality monitoring program, which includes water quality sampling and analysis.

Aquifer pollution vulnerability mapping over more extensive areas is required before commencement of advanced quarrying program to provide the general information needed for planning purposes. This will be performed before quarrying commences if an economic discovery is made. Such mapping will be followed by an inventory of subsurface contaminant load at a more detailed scale, at least within the more vulnerable areas.

5.3 Soils

The central regions of Namibia are dominated by eutric leptosols which are characterized as fertile soil with high base saturation, which are especially susceptible to erosion where there is any degree of slope (Mendelsohn et al, 2002). The soils in the region can be classified into three groups: Aeolian sands, Calcareous soils; and Lithosols. Aeolian sands are fine to medium, non-plastic and uniformly graded materials present in many sandy sites, mainly in desert areas. Lithosols are mainly group of shallow soils that lack well defined horizons, especially an entisol consisting of partially weathered rock fragments, usually on steep slopes. The Calcareous soils have a presence of significant quantities of free excess lime (calcium or magnesium carbonate). The lime dissolves in neutral to acid pH soil, but does not readily dissolve in alkaline soil and instead, serves as a sink for surface absorbed calcium phosphate precipitation (Taalab, 2018). **Figure 8** shows the map indicating the soil types covered by the MCs and **figure 9,** a picture of the soil found on site.

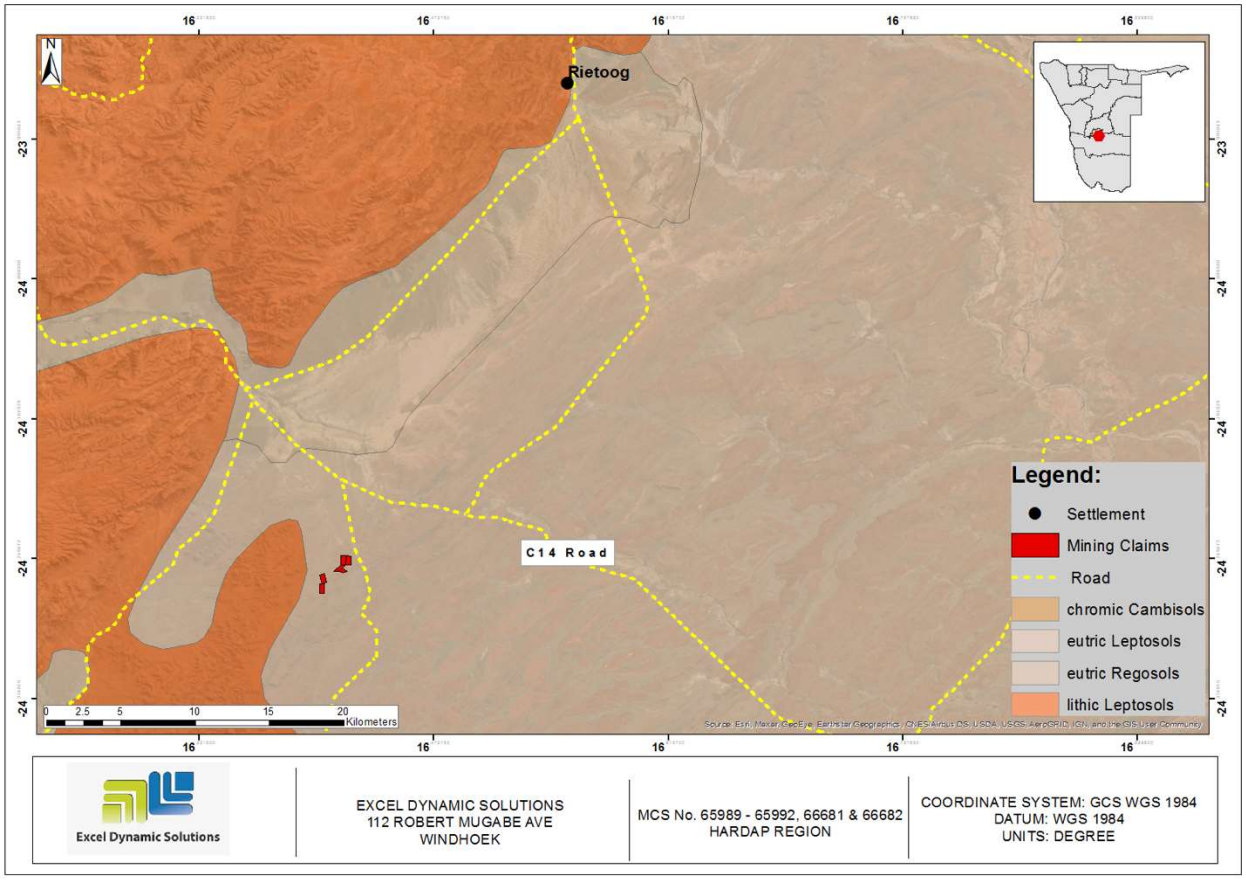


Figure 8: Typical soils on the proposed project site

Figure 9: Soil found on MCs site

5.4 Geology

The geology of Namibia consists of rocks of Archean to Phanerozoic age covering a history of over 2,600 Ma years. Deformed gneisses, amphibolites, meta-sediments, and the associated intrusive rocks occurring in central part of the country represent some of the oldest rocks of Paleoproterozoic age ranging from 2,200 to 1,800 Ma. The geology of the region is dominated by Neoproterozoic (1300Ma –900Ma) basins of the Sinclair Sequence and their equivalents which occur as relatively narrow, discontinuous, fault-bounded troughs which trend from southern, central and eastern Namibia. It is unconformably overlain by the Damara Sequence of the Kamtsas Formation. In central Namibia, copper mineralization, hosted by slate and phyllite, is intermittently developed over more than 60 km of strike of the Kagas Member of the Klein Aub Formation. The rocks of Rehoboth sequence belong to this age group (Singh, 2009). The country rocks are metasedimentary rocks composed mainly of carbonate, schists, and phyllites. They mainly belong to metamorphic complex of Khoabendus and Haib groups. They are further intruded by multiple quartz veins, which are extremely irregular in shape and vary in thickness from 20 to 70 cm (Singh, 2009). Locally developed karst in Nama limestones and on surficial Calcrete; dolomite sills locally weather rounded boulders. Below in **figure 10**, the map illustrates the specific rock types found at the site and **figure 11** shows the specific rocks found on site.

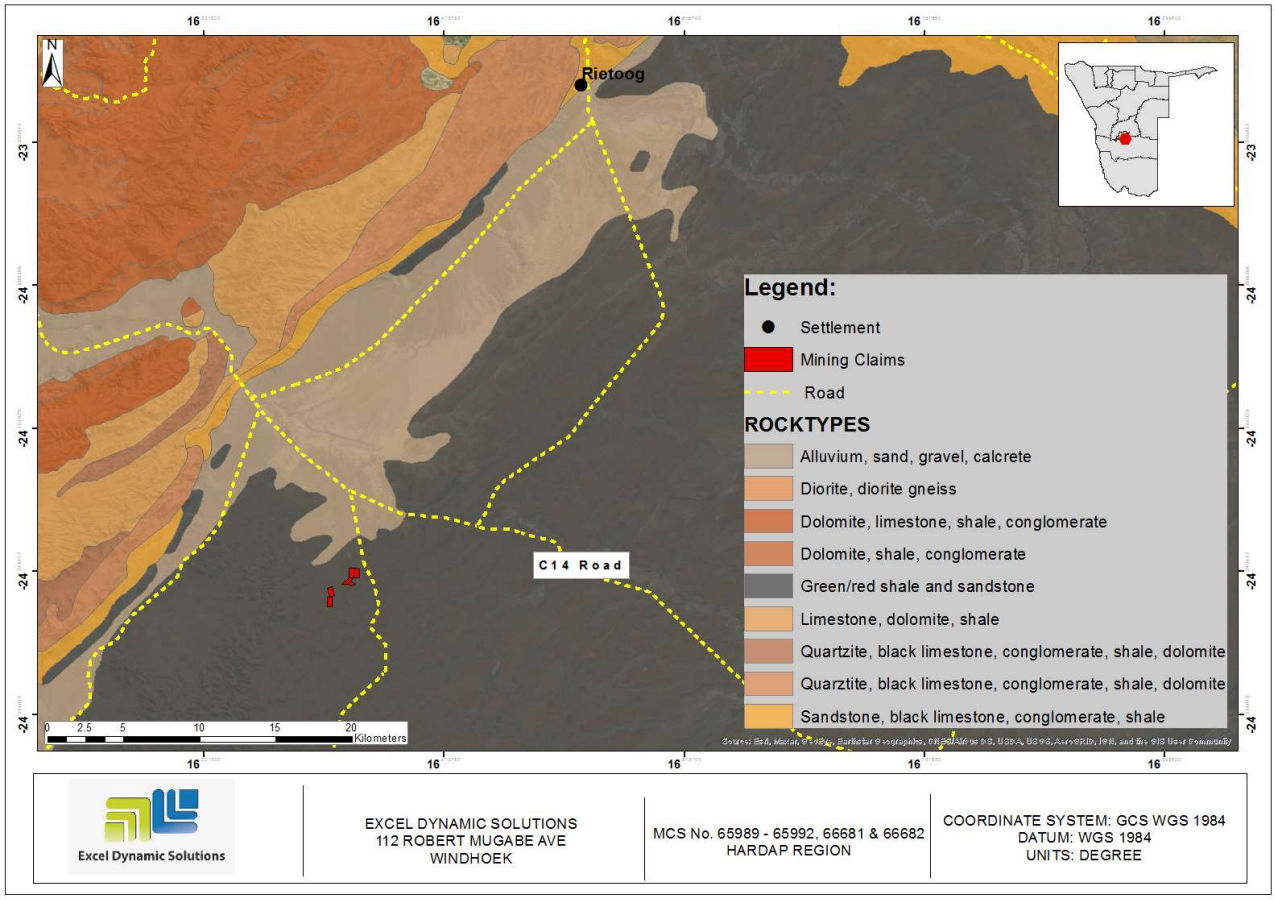


Figure 10: Map displaying geology of the project area.

Figure 11: Rock types at the MCs site

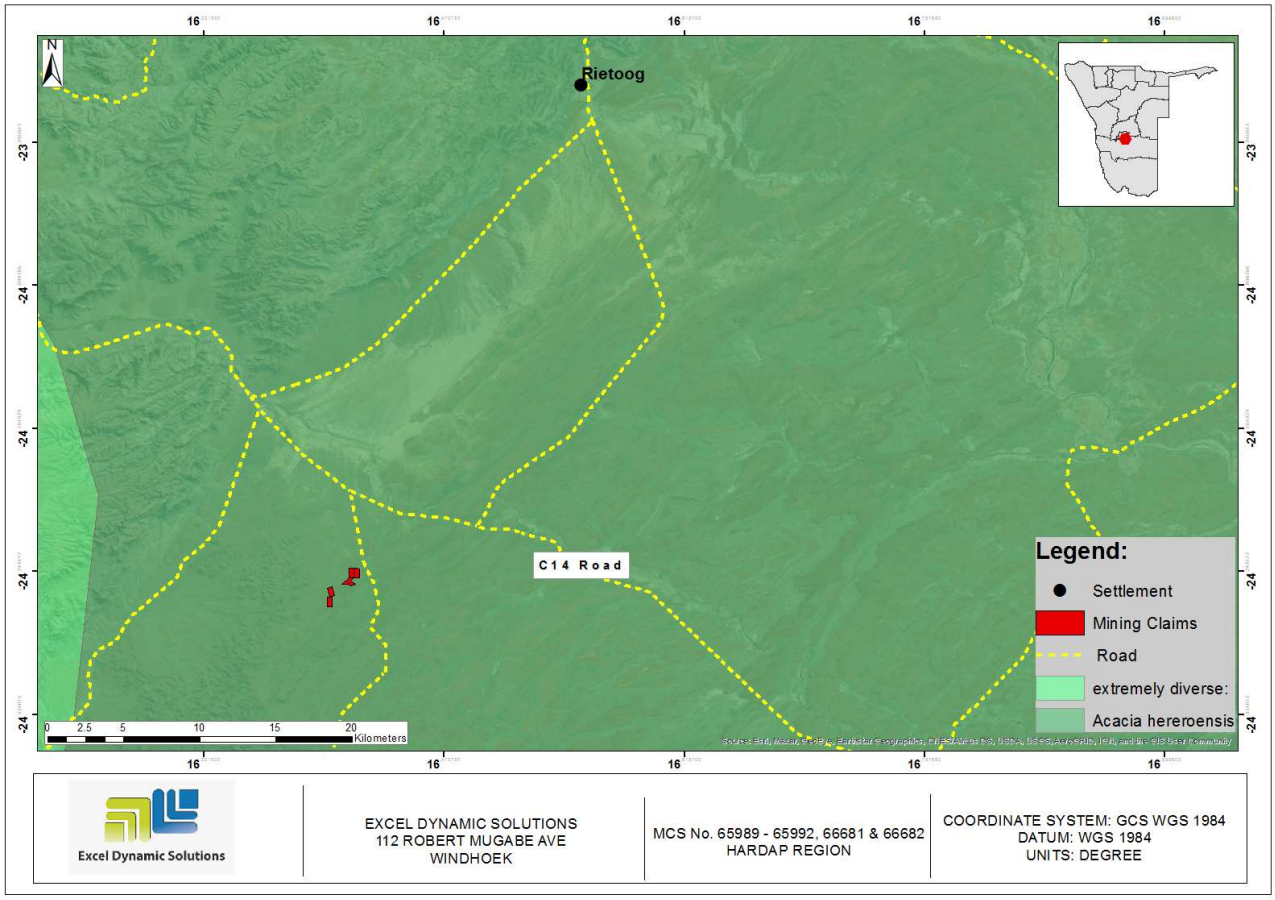
5.5 Fauna

The most common animals found in the Hardap region are Kudu, Oryx, Springbok, Steenbok, Hartmann's mountain Zebra, red hartebeest and ostrich. Furthermore, there is a small population of black rhinos in the area. There are about 300 bird species such as yellow-billed stork, osprey, African fish eagle, Goliath heron, Bradfield's swift and stark's lark. A number of these species, such as white- backed vulture and tawny eagle, are Red Data species. There is also likely to be greater levels of poaching. Although no mammal species in the MCs areas are likely to be affected by poaching, animal such as steenbok, warthog, kudu are of high conservation priority or significantly threatened by this activity, this will lead to loss of wildlife that many farmers are trying to build up for hunting and/or ecotourism purposes.

Site specific fauna are just small animals and no wild animals are found at the MCs area.

5.6 Flora

Hardap region has scarce vegetation consisting of isolated trees, shrubs and grass. Some parts have typical savannah or steppe vegetation, which provide forage for some small stock, while in the area with the red-Kalahari sandy soil and water springs crop production is carried out. About 70% of Namibia is savannah. In Central Namibia, thorn bush-savannah is dominant with extensive grasslands and acacia bush. Sporadically you see trees, mainly camel-thorn trees and other kinds of acacia which often grow near dry riverbeds (Namibia Travel Guide, 2010). Moreover, the area of the MCs is mostly dominated by *Acacia hereroensis* which are part of the dwarf shrub savanna. A mix of vegetation strata provides habitats for a great variety of wildlife, including invertebrates, browsers, grazers, scavengers and predators. It is worth noting that terms stipulated in the Forest Act, 2001 (Act No. 12 of 2001) in pertaining to the Plants diversity and structure should be adhered by the Proponent as required in the Forestry Act. **Figure 12 a & b** below shows the vegetation map in the project areas and the pictures of some of the plant species found on the project site, respectively.


Rietoog
C14 Road
Legend:
Settlement
Mining Claims
Road
extremely diverse:
Acacia hereroensis
0 2.5 5 10 15 20
Kilometers
Excel Dynamic Solutions
EXCEL DYNAMIC SOLUTIONS
112 ROBERT MUGABE AVE
WINDHOEK
MCS No. 65989 - 65992, 66681 & 66682
HARDAP REGION
COORDINATE SYSTEM: GCS WGS 1984
DATUM: WGS 1984
UNITS: DEGREE

a.

b.

Figure 12 (a & b): Vegetation structure and plants found in the vicinity of the MCs and the surrounding areas

5.7 Population of the Hardap Region

The Hardap region is the third largest region in Namibia with a total area of 109 659 km², making up 13.3% of the country's total land surface. The total population of Hardap Region was 79 000 (Namibia Statistics Agency, 2011), with the low population density of 0.6 persons per square kilometre. 75% of the entire region form part of commercial farms; 10% communal farmland and national parks claiming the 15% of the remaining area.

5.8 Tourism

Tourism is one of the main contributions to the Gross Domestic Product (GDP), in 2018 tourism contributed 10.9% to the Namibian economy. Hardap region has several tourists' attractions such as the world's oldest desert, the Namib Desert with the Kuiseb valley and river, where some of the oldest rocks are found, a part of the Namib Naukluft Park, as well as and the world renowned Sossuvlei and Sesreim. The Hardap Dam, found in the region, is also a well-known place because of its unique scenery.

Rehoboth is known for its few tourism attractions such as the Oanob Dam which is found about 7 kilometres from Rehoboth. Rehoboth museum, spa recreation resort, the Ginsberg Nature reserve and the Oanob Lake and game reserve are some of the tourism activities that can be found in and near Rehoboth (Hardap Regional Development Profile, 2015).

5.9 Surrounding Land Uses

The MCs fall within the Farm Ounoois (**Figure 13**), which belongs to the proponent. As per the Section 52 of the Minerals (Prospecting and Mining) Act No. 33 of 1992 and Section 2.2.3 of the Draft Minerals Policy of Namibia:

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

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

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

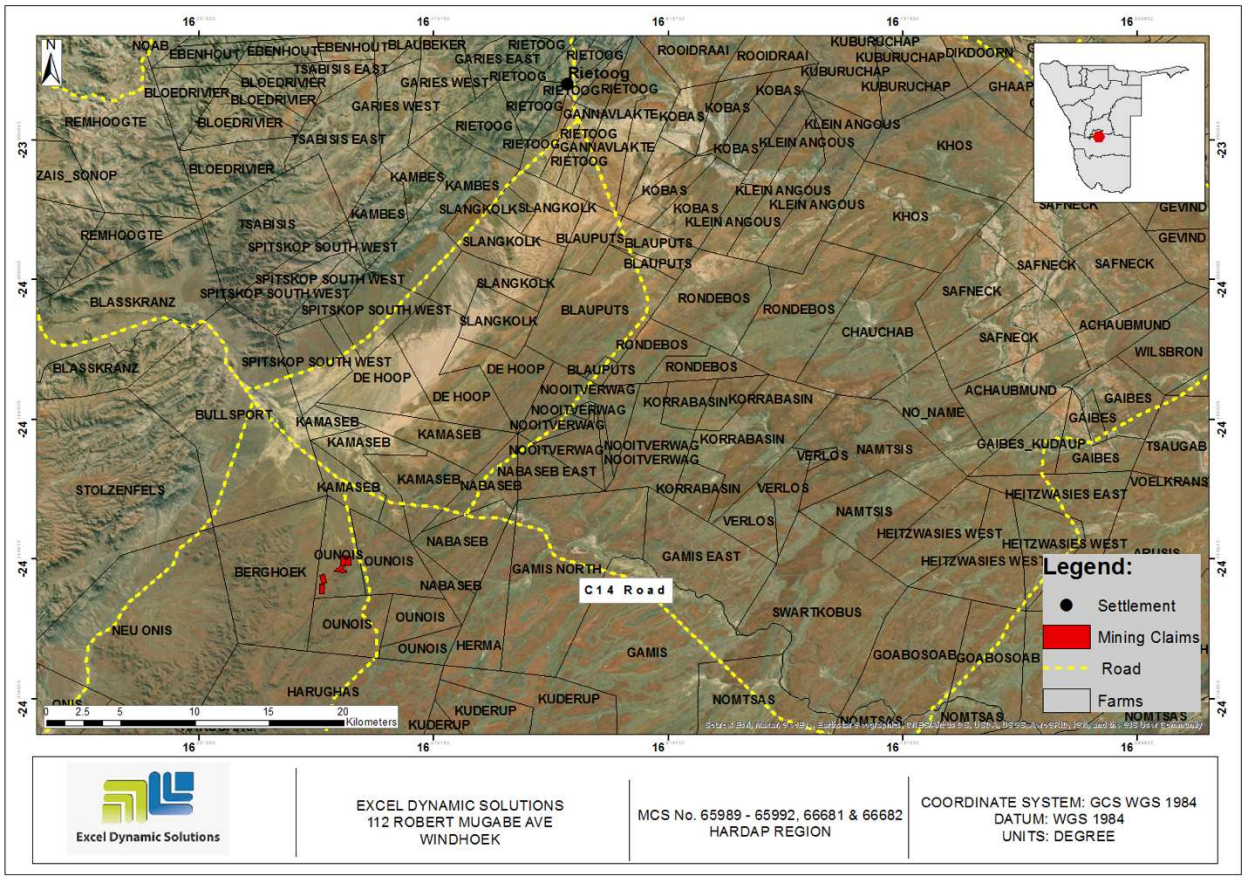


Figure 13: Map of the farm Ounoois covered by the MCs

5.10 Heritage and Archaeology

The Hardap Region has several heritage and archaeological sites such as monuments at Kub, cemetery at Nomtsas, Sam Khubis, Hoachanas, Kai//ganaxab, Lutheran Paulus Church, Drierivier archaeological sites and the famous Namib Naukluft Park. The Monument at Kub is located at Farm Voigtskub in Hardap region where it is a permanent proclamation. This monument is founded to commemorate the battle at Kub that was between the Germans and the Nama people in 1904. The cemetery at Nomtsas is a historical cemetery which contains pioneers who are associated with colonial endeavors. The Sam Khubis is a war memorial for the Rehoboth baster community in Namibia. Its name was derived from the shape of the rocks that were found at the fountain. Currently the area is identified by a white structure that resembles a pulpit where the plaque with the names placed during the commemorations where the community identifies it as a heritage site. Kai//ganaxab is of significance in Namibia's liberation struggle as it represents tangible evidence of the cruelty and pain that is often associated with the liberation struggle. Moreover, the main features identified at Kai//ganaxab is the old prison which has both movable and immovable heritage properties. The Drierivier archaeological site which located along in the Oanob River folds' plains. This site is important for producing burials under cairns that are evidence of the pre-colonial occupation of the area by the Khoekhoe. One of the graves found on the site is opened and preserved for scientific and educational purposes for visitors. Therefore, the grave is declared a national heritage property by National Heritage Council of Namibia (NHC, 2020). No archaeological assessment within the MCs was conducted during this scoping study, but there does exist a private cemetery on the farm Ounoois. **Figure 14** below shows the surrounding landscape of the area near the MCs and **figure 15** shows the private family cemetery on the farm.

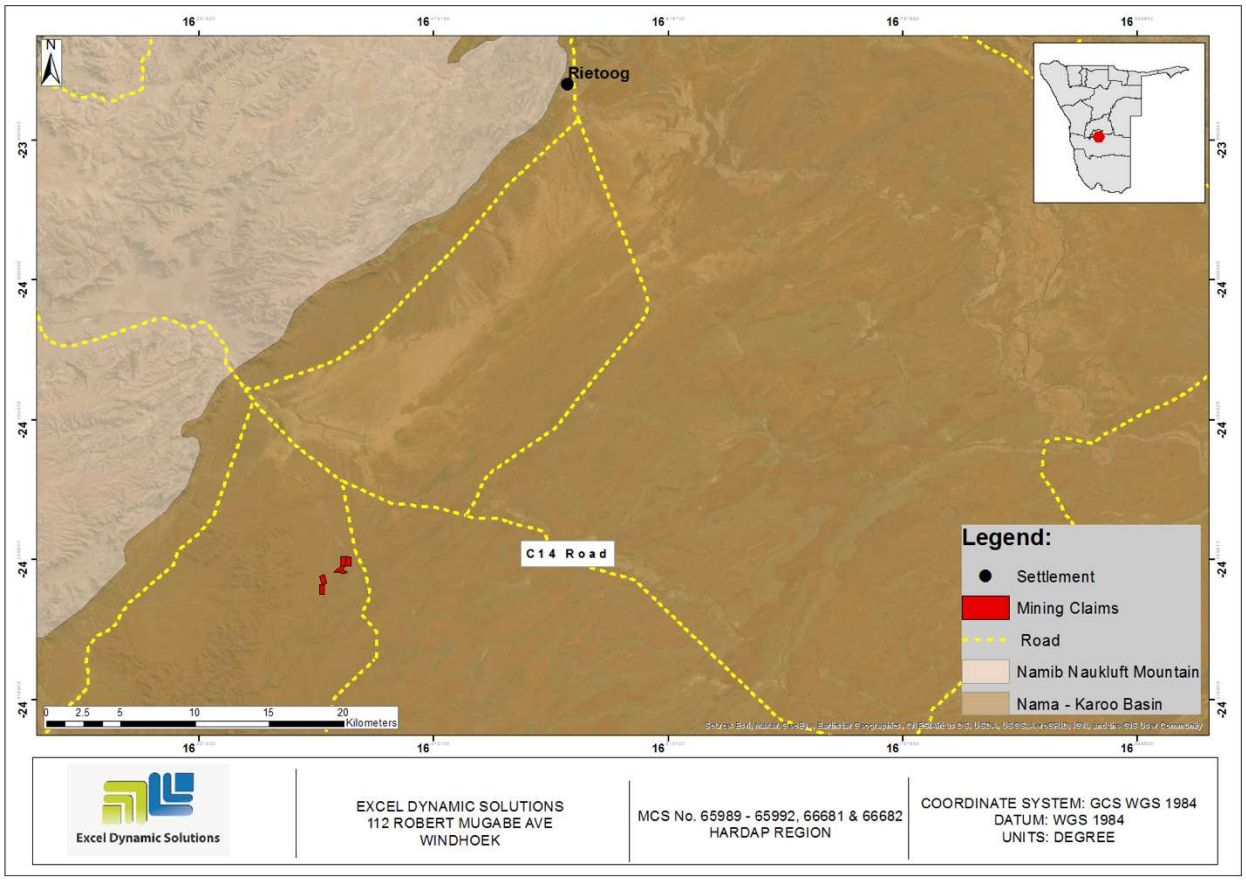


Figure 14: Map of Landscape of the vicinity of the MCs

Figure 15: Private cemetery on farm Ounoois

5.11 Socio – Economic Development

The Hardap region has a well-known and prosperous agricultural industry comprised mainly of cattle, goat and sheep farming. About 75% of the region is covered by commercial farming and the rest of the region is covered by 10% communal land and 15% national park as their source of income in the region Hardap Dam plays a major role as it is the agro-economic developed of the region. Furthermore, the region has a special focus on infrastructure rehabilitation, restoring service provision in health, education, security and justice sectors. Rehoboth, as the closest town to the MCs, is well-known for supply of labourers with construction skills. Construction is one of the catalysts of economic development in Namibia. This makes a significant contribution to infrastructure development, one of the pillars of the Harambee Prosperity Plan (HPP) (Hardap Regional Development Profile, 2015).

The proposed small-scale quarrying works on the MCs will create employment for the locals and contribute to the country's GDP. The quarrying activities will also produce a trained workforce and small businesses that can service communities and may initiate related businesses.

5.13 Services Infrastructure and Facilities

Regionally, the paved all weather Trans-Caprivi Highway road links Walvis Bay to the countries of Botswana, Zambia and Zimbabwe, as well as the Democratic Republic of Congo. In addition, the Trans-Kalahari Highway links Walvis Bay with South Africa's Gauteng industrial heartland via Botswana. A harbour (Namport) is found in Walvis Bay that gives a platform for samples and mined materials to be offloaded or loaded onto transnational shipping lines.

The MCs are situated near Rehoboth which is connected to the capital city Windhoek by dual lanes tarred road. Namibia is serviced by an international Airport located at Windhoek with daily flights to Europe and South Africa. Rehoboth and Klein Aub settlement are connected to the main electricity network as part of rural electrification programme (Hardap Regional Council, 2019). No electrical power supply for the small-scale quarrying work is planned, instead, a diesel power generator will be used during the quarrying activities. Rietoog has a school and two small shops. The school, WJD Cloete Junior Secondary School, opened in 1949, and currently has about 250 learners in grades 1-10. To travel locally, people ride in donkey carts, pulled by 2-4 donkeys. A minibus transports people to the nearest, larger town of Rehoboth. Cars are used by a few residents, but there are settlements off the main road and behind the school, which are

inaccessible by any form of transport. The M47 gravel road is used as a thoroughfare between Rehoboth and Naukluft.

6 PUBLIC CONSULTATION PROCESS

Public consultation forms an important component of an Environmental Assessment (EA) process. Public consultation provides potential Interested and Affected Parties (I&APs) with an opportunity to comment on and raise any issues relevant to the project for consideration as part of the assessment process. Public consultation has been done in accordance with both the EMA and its EIA Regulations.

The public consultation process assists the Environmental Assessment Practitioner (EAP) in identifying all potential impacts and to what extent further investigations are needed. Public consultation can also aid in the process of identifying possible mitigation measures.

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

The Consultant identified relevant and applicable national, regional and local authorities, church leaders, farm owners and other interested members of the public. The (pre-identified) I&APs were registered as I&APs upon their request (those that were registered after the EA notification in the newspapers). Newspaper adverts of the proposed small-scale quarrying activities were placed in the *Namibian* and *New Era* Newspapers, which are widely-read national newspapers in the region. The project advertisement / announcement ran for two consecutive weeks inviting members of the public to register as I&APs and submit their comments. The summary of pre-identified and registered I&APs is listed in **Table 3** below and the complete list of I&APs is provided in **Appendix D.**

Table 3: Summary of I&APs

National (Ministries and State-Owned Enterprises)
Ministry of Environment, Forestry and Tourism
Ministry of Urban and Rural Development
Ministry of Labour, Industrial Relations and Employment Creation
Ministry of Health and Social Services
Ministry of Agriculture and Water
Ministry of Mines and Energy
Roads Authority
Regional & Local Authorities
Hardap Regional Council
Rehoboth Town Council
NGOs, CBO, Associations

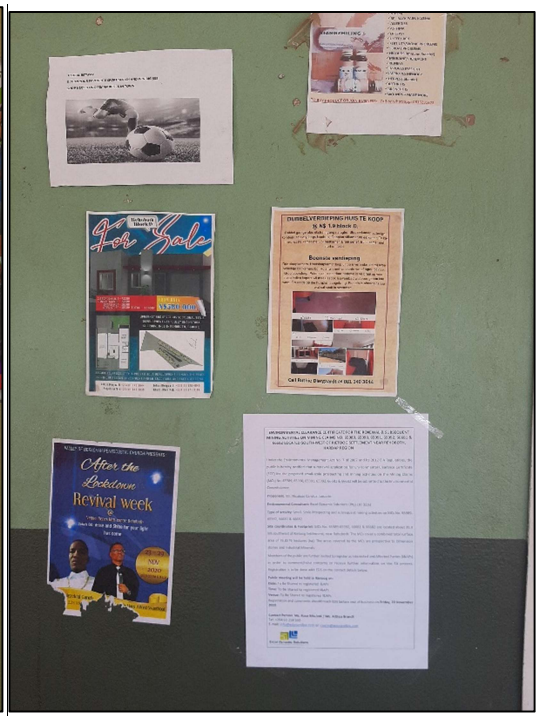
Namibia Community Based Tourism Association
Rehoboth Boerevereniging Namibia Farming
General Public
Interested members of the public & Farm Owners

6.2 Communication with I&APs

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

- A Background Information Document (BID) containing brief information about the proposed facility was compiled (**Appendix E**) and sent out to all pre-identified affected parties and upon request to all new registered Interested and Affected parties (I&APs);
- Project Environmental Assessment notices were placed in the *Namibian and New Era* (**Appendix F**) dated **29 October 2020** and **5 November 2020 (The Namibian),** and **28 October 2020 and 04 November 2020 (New Era)**, briefly explaining the activity and its locality, inviting members of the public to register as I&APs and submit their comments/concerns;
- Public notices were placed at frequented places in Rehoboth (**Figure 16**), informing members of the public about the EIA process and for them to register as I&APs as well as to submit comments; and
- There was no public meeting held but farm Ounoois was visited by the team of EDS (**Figure 17**).


CORONA VIRUS
PREVENTION MEASURES
SPAR
HERE ARE SOME THINGS YOU NEED TO KNOW!
TE HUUR
BRING YOUR
Party
TO OUR PARTY


For Sale
After the Lockdown
Revival week

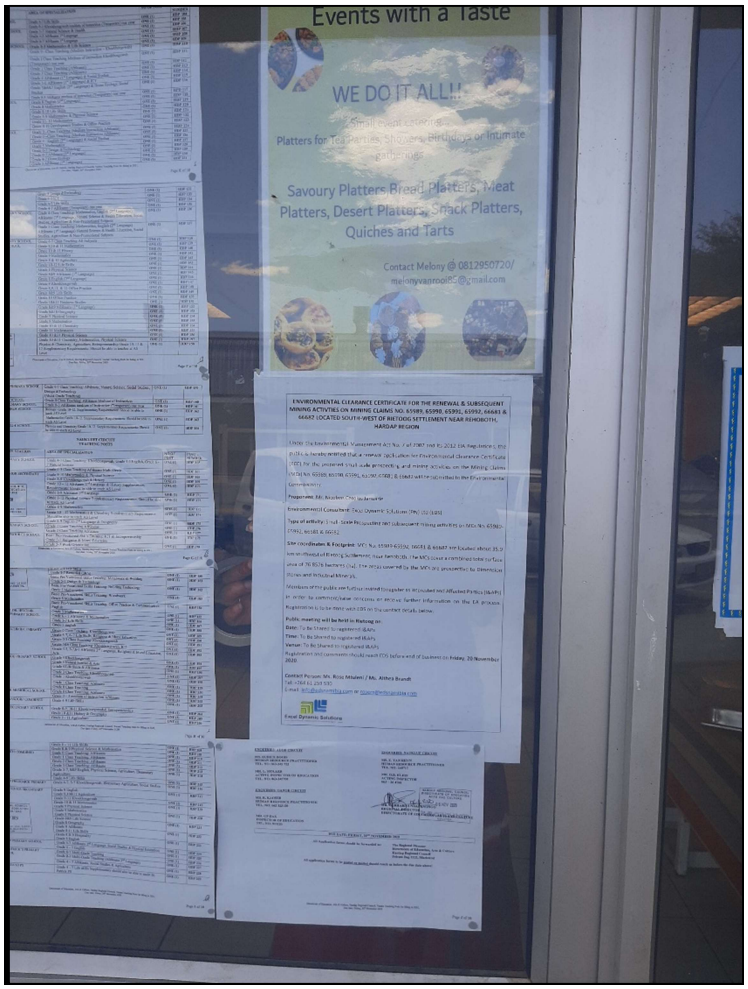

Events with a Taste
WE DO IT ALL!!
Platters for Tea Parties, Showers, Birthdays or Intimate gatherings
Savoury Platters, Bread Platters, Meat Platters, Desert Platters, Snack Platters, Quiches and Tarts
Contact Melony @ 0812950720/
melonyvanrooi82@gmail.com
ENVIRONMENTAL CLEARANCE CERTIFICATE FOR THE RENEWAL & SUBSEQUENT MINING ACTIVITIES ON MINING CLAIMS NO. 65989, 65990, 65991, 65992, 66681 & 66682 LOCATED SOUTH-WEST OF RIETOOG SETTLEMENT NEAR REHOBOTH, KARAS REGION

Figure 16: Public notices placed at Spar Volkswinkel, Woermann Brock and Bergland slaghuis (from top left, to top right and bottom, respectively)

Figure 17: Site visit on the 30th November 2020

6.2.1 First Round Public Feedback

No comments were received by the Consultant via email and other mode of communication after the EIA advertisement in the newspapers and upon placing public notices in Rietoog.

The Draft EIA report together with all its appendices will be circulated to all I&APs for review for a period not less than 7 days. Should there be any comments, these will be documented in a Comments and Response Trail Document and incorporated into the Final Report that will be then submitted to the DEA for evaluation and consideration of an ECC.

6.2.3 Second Round Public Feedback

No comments after sharing the draft report with registered interested and affected parties. No public meeting was held due to no comments received or people registering.

6.3 COVID-19 Influences

CODVID-19 has changed the way the world thinks, acts and does business. The pandemic has forced a comprehensive review of business practices, a higher level of engagement with technology to offset the constraints due to social distancing, restrictive travel, and a focus on social responsibility. The consulting team has to change very little in the way we operate and provide public consultation services.

Although the team operated with limited travel during the environmental assessment to comply with the regulations put in place, various other platforms were used to communicate the project information. These platforms included emails, notices, newspaper adverts, and telephonic communication.

Consulting team practices include but are not limited to:

- Social distancing will be strictly enforced when on project sites.
- Facemasks worn by members during site assessment visit

7 IMPACT IDENTIFICATION, ASSESSMENT AND MITIGATION MEASURES

7.1 Impact Identification

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

Positive impacts:

- Creation of jobs to the locals.
- Helps boost local economic growth.
- Open up other investment opportunities.
- Contribution to regional economic development.

Negative impacts:

- Possible destruction of faunal habitats as well as removal of vegetation that may be encountered within the target areas.
- Generation of dust from the quarrying and test quarrying activities and access gravel road
- Waste generation
- Visual impacts (scars) on landscape that will remain so for a very long time if not rehabilitated.
- Potential health and safety risks associated with mishandling of handheld equipment.
- Land quality impacts i.e., enhanced soil erosion
- Water quality changes (location of aquifer in relation to ore bodies)
- Environmental pollution
- Socio-economic and cultural issues, including sustainable development
- Climatological impacts on quarrying Operations, including precipitation and prevailing winds

7.2 Impact Assessment Methodology

The impact assessment method used for this project is in accordance with Namibia's Environmental Management Legislation (Environmental Management Act No. 7 of 2007) and its Regulations of 2012, as well as the International Finance Corporation (IFC) Performance Standards. Additionally, the Namibian Impact Assessment Method plays a significant role in undertaking an EIA in order to obtain an ECC, deemed if the listed activities do not oppose threat to the environment. The EIA process followed by the Consultant for this project is shown in **Figure 18**.

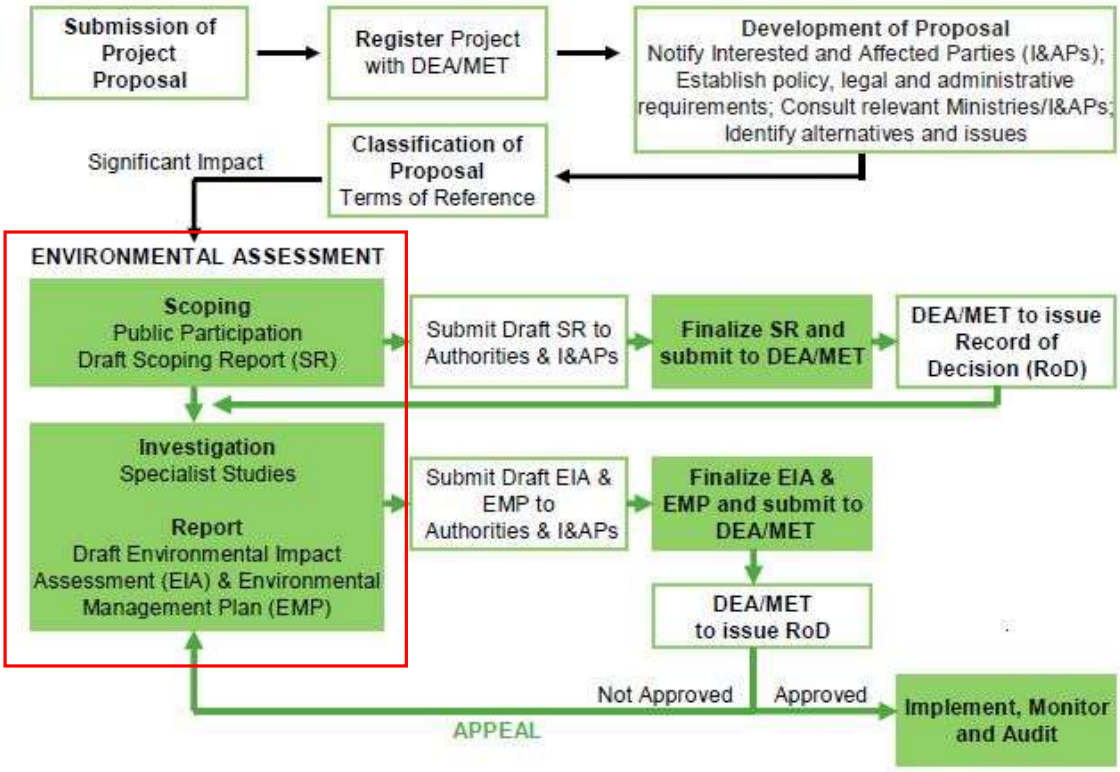


Figure 18: **Environmental Assessment Process and Progress (Source: Risk Based Solution, 2019)**

The identified impacts were assessed in terms of probability (likelihood of occurring), scale/extent (spatial scale), magnitude (severity) and duration (temporal scale) as presented in **Table 4**, **Table 5**, **Table 6** and **Table 7**.

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

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

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

7.2.1 Extent (spatial scale)

Extent is an indication of the physical and spatial scale of the impact. **Table 4** shows rating of impact in terms of extent of spatial scale.

Table 4: Extent or spatial impact rating

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

7.2.2 Duration

Duration refers to the timeframe over which the impact is expected to occur, measured in relation to the lifetime of the project. **Table 5** shows the rating of impact in terms of duration.

Table 5: Duration impact rating

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

7.2.3 Intensity, Magnitude / severity

Intensity refers to the degree or magnitude to which the impact alters the functioning of an element of the environment. The magnitude of alteration can either be positive or negative. These were also taken into consideration during the assessment of severity. **Table 6** shows the rating of impact in terms of intensity, magnitude or severity.

Table 6: Intensity, magnitude or severity impact rating

Type of criteria	Negative				
	H- (10)	M/H- (8)	M- (6)	M/L- (4)	L- (2)
Qualitative	Very high deterioration, high quantity of deaths, injury of illness / total	Substantial deterioration, death, illness or injury, loss of habitat / diversity	Moderate deterioration, discomfort, partial loss of habitat /	Low deterioration, slight noticeable alteration in habitat and	Minor deterioration, nuisance or irritation, minor change in

Type of criteria	Negative				
	H- (10)	M/H- (8)	M- (6)	M/L- (4)	L- (2)
	loss of habitat, total alteration of ecological processes, extinction of rare species	or resource, severe alteration or disturbance of important processes	biodiversity or resource, moderate alteration	biodiversity. Little loss in species numbers	species / habitat / diversity or resource, no or very little quality deterioration.

7.2.4 Probability of occurrence

Probability describes the likelihood of the impacts actually occurring. This determination is based on previous experience with similar projects and/or based on professional judgment. See **Table 7** for impact rating in terms of probability of occurrence.

Table 7: Probability of occurrence impact rating

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

7.2.5 Significance

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

Once the above factors (**Table 4**, **Table 5**, **Table 6** and **Table 7**) have been ranked for each potential impact, the impact significance of each is assessed using the following formula:

SP = (magnitude + duration + scale) x probability

The maximum value per potential impact is 100 significance points (SP). Potential impacts were rated as high, moderate or low significance, based on the following significance rating scale (**Table 8**).

Table 8: Significance rating scale

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

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

The assessment of the small-scale quarrying phase is done for both pre-mitigation (before implementing any mitigation) and post-mitigation (after mitigations are implemented).

The risk/impact assessment is driven by three factors and these are:

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

According to Booth (2011), a pollutant linkage occurs when a source, pathway and receptor exist together. The objective with the mitigation measures is to firstly avoid the risk and if the risk cannot be avoided, mitigation measures to minimize the impact are recommended. Once the mitigation measures have been applied, the identified risk will be of low significance.

The impact assessment for this EIA focuses on the project phases namely; ground surveys, advanced sampling (and possible analysis) and decommissioning. The potential negative impacts stemming from the proposed activities are described, assessed and mitigation measures provided thereof. Further mitigation measures in a form of management action plans will be provided in the Draft Environmental Management Plan.

7.3 Assessment of Potential Negative Impacts: Small-scale quarrying (Operational Phase)

The main potential negative impacts associated with construction and operational (and maintenance phases) identified are; soil disturbance, dust (air pollution), visual impact, loss of biodiversity (fauna and flora), health and safety, archaeological impact, waste generation and noise pollution. Potential impacts identified to be associated with the small-scale quarrying discontinuation are loss of employment opportunities and loss of economic growth for the country.

- *Loss of biodiversity* **-** possible destruction of faunal habitats that may be encountered within the site soils.
- *Generation of dust (air quality)* **-** generation of dust from the unpaved site access roads during construction and possible gaseous emissions into the air by unserviced vehicles and machinery
- *Waste generation* - potential environmental pollution through uncontrolled waste disposal.
- Visual impact
- *Potential health and safety risk* - potential health and safety risks associated with mishandling of project equipment.
- *Surrounding soils impact* **-** disturbance of site soils by quarrying activities, project vehicles and machinery.
- *Groundwater impact* – potential pollution of aquifer
- *Archaeological impact* - potential uncovering of unknown archeological objects during construction works or operational phase.
- *Noise and vibrations* – noise due to digging and drilling during the small-scale quarrying

7.3.1 Loss of Biodiversity (Fauna and Flora)

Land degradation will be created due to digging and earthworks done to uncover the mineralized rock units. This destruction or modification of the area can have an impact on the biodiversity of the area. This can lead to habitat loss for a diversity of flora and fauna ranging from microorganisms to large animals. Endemic species are most severely affected since even the slightest disruptions in their habitat can result in extinction or put them at high risk of being wiped out. It is therefore important to identify what species are present, understand them and try to minimize the impact upon them with operational management guidelines the Consultant advises the Proponent to avoid unnecessary removal of vegetation, in order to promote a balance between biodiversity and their operations. Under the current status, the impact can be considered to be of a medium significance rating. With the implementation of appropriate mitigation measures, the rating will significantly be reduced to low. The impact is assessed in **Table 9** below.

Table 9: Assessment of the impacts of small-scale quarrying on biodiversity

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	M - 3	M - 6	M - 3	M – 36
Post mitigation	L/M - 2	L/M - 2	L/M - 4	L/M - 2	L - 16

Mitigations and recommendation to minimize the loss of biodiversity

- Vegetation found on the site, but not in the targeted quarrying areas should not be removed, but left to preserve biodiversity on the site.
- Even if a certain shrub or tree is found along drilling or sampling spots on sites, this does not mean that it should be removed. Therefore, care should be taken when extracting mineral resources without destroying the vegetation.
- Workers should refrain from killing or snaring animals' species (big or small) that may be found on the site.
- Environmental awareness on the importance of biodiversity preservation should be provided to the workers.

7.3.2 Generation of Dust

During the small-scale quarrying phase, dust particles generated during digging and mineral extraction, can be readily inhaled and deposited in the airways (WHO, 2016). It is also important to note that dust is toxic to lung tissue and to the immune system, causing progressive scarring. HIV infection coupled with occupational exposure to silica dust are important risk factors for tuberculosis (WHO, 2016). For this implied project, digging will be the only ground bearing activity and therefore this impact has a medium significance. The impact will be of low significance from medium, upon implementing the mitigation measures. The impact is assessed in **Table 10** below.

Table 10: Assessment of the impacts of small-scale quarrying on air quality

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	L/M - 2	L/M - 2	L/M- 4	L/M - 2	M – 16
Post mitigation	L - 1	L - 1	L- 2	L - 1	L - 4

Mitigations and recommendation to minimize dust

- The Proponent should ensure that the activities related to small-scale quarrying should be scheduled to the given number of days of the week, but not every day. This will keep the vehicle-related dust level minimal in the area.
- Since the project site is in an area where soils are exposed due to little vegetation cover, it is highly probable that more dust will be generated from quarrying works. It is therefore advised that in extremely windy days, a reasonable amount of water should be used to supress the dust that may be emanating from certain areas on the MCs.

7.3.3 Waste Generation

During the quarrying phase, there will be generation of waste of all kinds (domestic and general). Therefore, land and water pollution can occur on the site or around the site if these generated wastes are not disposed in a responsible way. Industrial waste is a given by-product of any quarrying operation. Non-biodegradable and biodegradable refuse should be stored in a container and collected on a regular basis and disposed of at a recognized disposal facility. Precautions should be taken to prevent any refuse spreading. The container should be covered with mesh to prevent access from animals. Without any mitigation measure, the impact has a medium significance. The impact will be of low significance from medium, upon implementing the mitigation measures. The assessment of this impact is given in **Table 11**.

Table 11: Assessment of the impact of waste generation

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

Mitigations and recommendation to waste management

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

7.3.4 Visual Impact (Scars) on Landscape

Small-scale quarrying activities leave scars on the landscape thus, causing a visual impact. If the intended site is situated near tourists' routes, these scars may contrast the surrounding landscape and this can potentially cause visual nuisance to tourists. However, it is vital to note that throughout the quarrying phase, assured measures will need to be taken into concern regarding the visual aspect. Currently, the visual impact can be rated as medium significance, reduced to low upon effectively implementing the measures. The assessment of this impact is presented in **Table 12**.

Table 12: Assessment of the small-scale quarrying on the visual aspect

	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	M - 3	M - 6	M - 3	M – 36
Post mitigation	L/M - 2	L/M - 2	L/M - 4	L/M -2	L - 16

Mitigations and recommendation to minimize visual impact

- The Proponent should consider the implementation of continuous rehabilitation programme, by using overburden waste rocks.

7.3.5 Potential Health and Safety Risks

Inappropriate handling of materials and equipment may cause health and safety risks such as injuries to workers. The impact is probable and has a medium significance rating. However, with adequate mitigation measures, the impact rating will be reduced to low. This impact is assessed in **Table 13** below and mitigation measures provided.

Table 13: Assessment of the impacts of small-scale quarrying on health and safety

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	L/M - 2	M - 6	M/H - 4	M – 44
Post mitigation	L/M - 2	L/M - 2	L - 2	L/M - 2	L - 12

Mitigations and recommendation to minimize health and safety issues

- As part of their induction, the workers should be provided with an awareness training of the risks of mishandling equipment and materials on site.
- When working on site, employees should be properly equipped with personal protective equipment (PPE) such as coveralls, masks, gloves, safety boots, earplugs, safety glasses, etc.
- No employee should be allowed to drink alcohol prior to and during working hours as this may lead to mishandling of equipment which results into injuries and other health and safety risks.
- Employees should not be allowed on site if under the influence of alcohol.

7.3.6 Surrounding Soils and Groundwater Impacts

The planned small-scale quarrying activities will potentially disturb the soil structure on the site, which will leave the already exposed site soils vulnerable to erosion resulting into creation of gullies. Similarly, the planned activities may have a negative impact on the groundwater, thus comprising the water quality. The impact can be rated as medium, if no mitigation measures are implemented. However, with the implementation of mitigation measures, the impact will reduce to low. The impact is assessed in **Table 14** below and mitigation measures are provided below.

Table 14: Assessment of the impacts of the small-scale quarrying on soils

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

Mitigations and recommendation to minimize impact on soil

- Overburden material (if any) should be handled more efficiently during quarrying operations to avoid erosion when subjected erosional processes.
- Prevent the creation of huge piles of waste rocks by performing sequential backfilling.
- Careful storage and handling of hydrocarbons on site is essential.
- Potential contaminants such as hydrocarbons and waste water should be contained on site and disposed of in accordance to municipal wastewater discharge standards so that they do not contaminate surrounding soils and eventually groundwater.
- An emergency plan should be available for major / minor spills at the site during operation activities (with consideration of air, groundwater, soil and surface water) and during the transportation of the product(s) to the sites

7.3.7 Archaeological Impact

Historical resources may be impacted through unintentional destruction or damage, during quarrying activities. This impact can be rated high to medium, if there are no mitigation measures in place. Upon implementation of the necessary measures, the impact will be low. The impact is assessed **Table 15**.

Table 15: Assessment of the impacts of small-scale quarrying on archaeological sites

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	M - 3	M - 6	M - 3	M – 36
Post mitigation	L/M - 2	L/M- 2	L/M - 4	L/M -2	L - 16

Mitigations and recommendation to minimize impact on archaeological sites

- The Proponent should consider having a qualified and experience archaeologist on standby during quarrying the 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.

7.4 Assessment of Potential Negative Impacts: Decommissioning and Rehabilitation Phase

Impacts pertaining to the closure of the small-scale quarrying program have been identified. The impacts are; loss of employment by workers and contribution to the national economy (revenue and royalties' payments). Another concern that stems from the quarrying program closure is the rehabilitation of the sites.

7.4.1 Impact on Employment Opportunities and Economic Contribution

Should the small-scale quarrying program come to an end, workers that are employed by the quarrying company will lose their jobs and source of income. This will also mean that there will be no more revenue and royalties paid to the government. This impact can be rated as of medium significance and given that the program has defined timeframe, only so much can be done by the Proponent to assist the workers in this regard. Regarding the national revenue and royalties' payment, there will be unfortunately nothing that the Proponent would do to mitigate this. The impact significance of unemployment can be reduced from medium to low, by implementing mitigation measures. The impact assessed in **Table 17** below is that of employment loss only.

Table 16: Assessment of the impacts of small-scale quarrying activities' closure

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	L/M - 2	M - 6	M/H - 4	M – 44
Post mitigation	L/M - 2	L/M - 2	L/M - 4	L/M - 2	L - 16

Mitigations and recommendation to minimize joblessness

- The Proponent should inform the employees on time, of its intentions to cease the quarrying works and the expected date of such closure. This will provide the employees with enough time to search for work elsewhere.
- The Proponent should raise awareness of the possibilities for work in industrial sectors.

7.4.2 Impact on Groundwater

Should the quarrying activities be decommissioned, and the quarrying area be rehabilitated, groundwater pollution may occur if contaminated soils are utilised during rehabilitation. The assessment of this impact is presented in **Table 18.**

Table 17: Assessment of the impacts of small-scale quarrying on soils and Groundwater

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

Mitigations and recommendation to minimize impact on soil

- Rehabilitation of the site to acceptable standards should be commenced once quarrying works cease
- Landowners should be consulted to indicate acceptance of the rehabilitation

To conclude this section, it is found that most of the identified potential negative impacts are rated as medium significant. Therefore, in order to reduce the significance from medium to low, it is recommended that the Proponent effectively implement mitigation measures. In order to maintain low significance, the implementation of measures will need to be continuously monitored.

8 RECOMMENDATIONS AND CONCLUSIONS

8.1 Recommendations

The key potential impacts associated with the proposed small-scale quarrying program and its associated activities were identified and assessed. In order to avoid and minimise (where impacts cannot be avoided) the identified project impacts, mitigation measures were recommended. The significant identified impacts for the project phases on the environmental features are summarized below. These impacts can be reduced or minimised by implementing the mitigation measures and given under the impact assessment chapter and also management actions plan provided in the Draft EMP.

- **Loss of Biodiversity**: The Consultant has advised the Proponent (in **section 7.3.1**) to avoid unnecessary removal of vegetation, in order to promote a balance between biodiversity and their operations. Under the current status, the impact can be considered to be of a medium significance rating. With the implementation of appropriate mitigation measures (EMP, **Appendix B**), the rating will significantly be reduced to low.
- **Generation of Dust (Air quality)**: The generation of dust by quarrying operations is considered minimal, and therefore of medium significance without any mitigation measures. The medium significance of this impact can be reduced by properly implementing mitigation measures (**Section 7.3.2** and EMP, **Appendix B**).
- **Waste Generation:** Without any mitigation measure, the impact has a medium significance. The impact will be of low significance from medium, upon implementing the mitigation measures (**Section 7.3.3** and EMP, **Appendix B**).
- **Visual Impact (Scars) on Landscape:** Currently, the visual impact can be rated as slightly medium to low significance, but upon effectively implementing the measures (provided in the EMP).
- **Potential Health and Safety Risks:** Improper handling of quarrying materials and equipment may cause health and safety risks such as injuries to workers. The impact is probable and has a medium significance rating. However, with adequate mitigation measures, the impact rating will be reduced to low (**Section 7.3.4** and EMP, **Appendix B**).

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- **Soils and Groundwater Impacts:** The impact can be rated as medium, if no mitigation measures are implemented. However, with the implementation of mitigation measures, the impact significance will reduce to low (**Section 7.3.6** and EMP, **Appendix B**).
- **Archaeological Impact:** There is no information provided and/or established about the known heritage or site of cultural values within the MCs or in the vicinity of the project site area. Therefore, this impact can be rated medium to low, if there are no mitigation measures in place. Upon implementation of the necessary measures, the impact significance will be low (**Section 7.3.7** and EMP, **Appendix B**).

8.2 Conclusions

The potential positive and negative impacts stemming from the intended continuation of the small-scale quarrying activities upon renewal of the MCs were identified, assessed and mitigation measures made thereof. The mitigation measures and recommendations provided in this EA report and the management action plans provided in the draft EMP can be deemed sufficient to avoid and/or reduce (where impact avoidance is impossible) the risks to acceptable levels. The Consultant is therefore confident that these measures are sufficient and thus recommends that the Proponent be issued with the Environmental Clearance Certificate (ECC) to enable the quarrying work on the tenements. However, the ECC should be issued on a condition that the provided management measures and action plans are effectively implemented on site and monitored. Most importantly, monitoring of the environmental components described in the impact assessment chapter should be conducted by the Proponent and applicable Competent Authority. This is to ensure that all potential impacts identified in this study and other impacts that might arise during the quarrying program implementation are properly identified in time and addressed. Lastly, should the ECC be issued, the Proponent will be expected to be compliant with the ECC conditions as well as legal requirements governing the small-scale quarrying and related activities.

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