



**Environmental Scoping Assessment (ESA) Report for the Proposed Establishment and Operation of a Quarry and Stone Crushing Plant on Mining Claim 72245, Khomas Region**

**MEFT Application No.:** APP - 002139

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**Proponent:** Eagle Focus Investments cc

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## **EXECUTIVE SUMMARY**

Eagle Focus Investments cc (hereinafter referred to as the *Proponent*) intends to carry out small-scale quarrying and crushing of quartzite rock on Mining Claim 72245 which overlies Farm Sonneiten no. 78 in the Khomas Region. This mining claim has a surface area of 17 Ha, and overlies the north-facing slope of an extensive quartzite hill.

The proposed quarrying and crushing activities are aimed at producing durable construction aggregates of various sizes, for use in road and general building construction works in the area of Windhoek and surrounding developments. The proposed activities are amongst the listed activities under the Environmental Management Act (EMA) No. 7 of 2007 and its 2012 Environmental Impact Assessment (EIA) Regulations, which may not be undertaken without an environmental clearance certificate (ECC). For this reason, the proponent appointed Omavi Geotechnical & Geo-Environmental Consultants CC (hereinafter referred to as *Omavi Consultants*) to conduct an Environmental Impact Assessment (EIA) and compile a technical report that would support application for an ECC from the Ministry of Environment, Forestry and Tourism.

This document contains all the information that was gathered from the environmental assessment process including a description of the proposed project activities and alternatives; legal requirements; the baseline environmental conditions; public consultation feedback; identified potential environmental impacts, their systematic assessment and provision of the necessary practical measures to manage, prevent and/ or minimize each impact's significance.

### **Key potential impacts identified for the project**

**Omavi consultants have identified the following adverse potential impacts that could arise from the proposed activities during the different life cycles of the project:**

- Physical disturbance of soils, topography and general landscape;
- Impacts on air traffic through fly rocks and dust generated from blasting
- Impact on air quality (due to dust generation);
- Impacts on biodiversity (forced migration of fauna; removal of flora; damage to vegetation due to veld fires);
- Potential increase in noise level from project activities;
- Impact on aesthetic value (due to lighting at night, visible infrastructure and exposed rock slopes);

## **Environmental Scoping Assessment: Quarrying and Crushing Activities on Mining Claim 72245**

- Potential environmental (water, soils and the general landscape) pollution (due to oil spills, littering, soil erosion, etc);
- Potential disturbance of unforeseen archeological/heritage site;
- Occupational Health and safety issues;
- Compromise on security due to increase farm access;
- General social nuisance to farmers/landowners; and
- Risk of not rehabilitating the affected sites after proposed activities have ceased.

Other impacts identified by the Omavi Consultants based on experience from similar projects.

- Compromised relationships between the proponent and landowners due to poor, improper or untimely liaison between project Proponent and farmers or occupiers of land.
- Increased strain on farm and surrounding services infrastructure such as access roads, water infrastructure and sources, fences and gates

### **The positive impacts anticipated from the proposed project are as listed below:**

- Socio-economic development through employment creation; skills transfer; and business opportunities for support services;
- Improved geological understanding of the site;
- Contribution towards national economy through the payment of taxes and levies to the responsible local authorities and institutions of the Government of the Republic of Namibia (e.g. MME).
- Economic benefits to landowners through surface rental fees and;
- Increased supply of durable aggregates for road layer works and concrete making in the area of Windhoek and surrounding areas

Based on the systematic impact assessment completed, the adverse impacts were found to have a medium to low level of significance, which can be lowered further if the recommended mitigation measures are implemented.

## **Key Conclusions and Recommendations**

Based on the assessment carried out, it was found that if the various impact management and mitigation measures are effectively implemented, the adverse impacts identified and evaluated can be reduced to a low risk or low significance level. Accordingly, it is recommended that an Environmental Clearance Certificate may be issued for the proposed activities, subject to the following recommendations:

- All required permits, licenses and approvals for the proposed activities should be obtained as required. These include surface lease agreements with the landowner(s), permits for groundwater abstraction, blasting permits, etc.
- The Proponent complies with the legal requirements governing this type of project and its associated activities.
- All mitigations provided in this ESA Report and the management plan in the EMP should be implemented and monitoring conducted as recommended.
- All the necessary environmental and social (occupational health and safety) precautions provided are to be adhered to.
- Site areas where quarrying activities have ceased should be rehabilitated as far as reasonably practical.
- The monitoring of the implementation of mitigation measures should be conducted, applicable impact's actions taken, reporting done and recorded as recommended in the EMP.
- All unforeseen sites of heritage, religious and archaeological importance discovered during the undertaking of the proposed activities are reported timeously to the National Heritage Council of Namibia.

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**LIST OF ABBREVIATIONS**

<b>DEAF</b>	Department of Environmental Affairs and Forestry
<b>EA</b>	Environmental Assessment
<b>EIA</b>	Environmental Impact Assessment
<b>ESA</b>	Environmental Scoping Assessment
<b>EMP</b>	Environmental Management Plan
<b>EMA</b>	Environmental Management Act
<b>ECC</b>	Environmental Clearance Certificate
<b>I&amp;APs</b>	Interested and Affected Parties
<b>IUCN</b>	International Union for Conservation of Nature
<b>MC</b>	Mining Claim
<b>MAWLR</b>	Ministry of Agriculture, Water & Land Reform
<b>MEFT</b>	Ministry of Environment, Forestry and Tourism
<b>MLIEC</b>	Ministry of Labour, Industrial Relations and Employment Creation
<b>MME</b>	Ministry of Mines and Energy
<b>MWT:</b>	Ministry of Works and Transport
<b>OGGC</b>	OMAVI Geotechnical and Geo-environmental Consultants cc
<b>TA</b>	Traditional Authority



## **1 INTRODUCTION**

**Eagle Focus Investments cc** (herein referred to as Eagle Focus), intends to apply for environmental clearance to commercially establish and operate a quarry and crushing plant on mining claim 72245, located on Farm Sonnleiten No. 78, for the production of construction aggregates. The proposed crusher plant has a capacity to produce 180 tons per hour of construction aggregates. The mining claim is completely lies within the Windhoek Extension boundary (As extended in 2012) (personal communication with Mr. Shikongo, Environmental Department, City of Windhoek, 2020), is accessed via an existing farm access trunk road which branches off from the B6 National road between Windhoek and Hosea Kutako International Airport. No traditional authority or conservancy is registered in the project area.

According to the Environmental Management Act (EMA) No. 7 of 2007 and its Environmental Impact Assessment (EIA) Regulations of 2012, the proposed activities are listed activities under the below stated provisions of the EMA and may not be undertaken without an Environmental Clearance Certificate (ECC). The provisions of such listed activities in the EMA are as follows:

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

Omavi Geotechnical and Geo-environmental Consultants cc (OGGC) was appointed to conduct an Environmental Assessment (EA) as per the above-mentioned Act and its Regulations. The assessment aims to identify and address ecological and socio-economic impacts and issues related to the quarry and crushing activities.

It is vital that all possible impacts on the environment arising from the proposed project are considered and that appropriate measures to manage, prevent and/or minimize the significance (if avoidance is impossible) of such impacts/ issues are thoroughly evaluated. All this is done to ensure that the project's activities are implemented in an environmentally and socially friendly manner to ensure sustainability, reduction of adverse impacts to acceptable levels, while maximizing potential positive impacts (benefits) from the projects.

## **Environmental Assessment Report: Quarrying & Crushing Activities on Mining Claim 72245**

This document aims to establish baseline conditions of the receiving environment, identify and evaluate potential environmental impacts associated with the proposed quarry and crushing plant on MC 72245, at various stages of the project's life cycle. The accompanying Environmental Management Plan (EMP) provides recommended mitigation and monitoring measures to minimize and/ or manage the significance of such impacts, where complete avoidance is impossible. Collectively, this document together with the EMP will support the Proponent's application for environmental clearance from the Ministry of Environment, Forestry and Tourism (MEFT) and the Ministry of Mines and Energy (MME) to permit the planned activities. This scoping report will further assist the the Ministry of Environment, Forestry and Tourism's (MEFT) Department of Environmental Affairs (DEA) in making an informed, knowledge-based decision on the issuance of the Environmental Clearance Certificate (ECC) for the proposed activities.

### **1.1 Project Need and Desirability**

Presently, there is a short supply of quality construction aggregates for the construction of roads and general buildings in the Windhoek area, due to there being only two major suppliers, namely: the Aris Quarry located south of Windhoek and the City Sand quarry located north of Windhoek. The presence of only two major quarries for the supply of construction aggregates has proven in the past to cause significant project delays and cost overruns due to untimely delivery for such key products arising from imbalances between supply and demand. The establishment and operation of the proposed quarry and crusher plant on Mining Claim 72245 will thus go a long way in curbing or contributing to this supply – demand imbalance.

Additionally, the proposed project is desired because of the following additional benefits anticipated from the project:

- The project has significant potential to provide durable specialised stones for infrastructure development projects around Windhoek.
- Eagle Focus is wholly owned and managed by previously disadvantaged Namibians. Hence, the project will contribute positively towards the government's Black Economic Empowerment (BEE) policy
- The project is expected to create employment for about 10 to 15 people during different stages of its life cycle and
- The project activities will boost business for local transportation businesses as sub-contractors would be used to transport and distribute the final product, i.e. construction aggregates.

## 1.2 Project Location

Mining Claim 72245 is located about 40 km east of Windhoek on Farm Sonnleiten No. 78 (which is part of the broader Ondekaremba farm), and covers an area of 17 Ha (refer to **Figure 1-1**).

The coordinates of the mining claim are provided in **Table 1-1**.

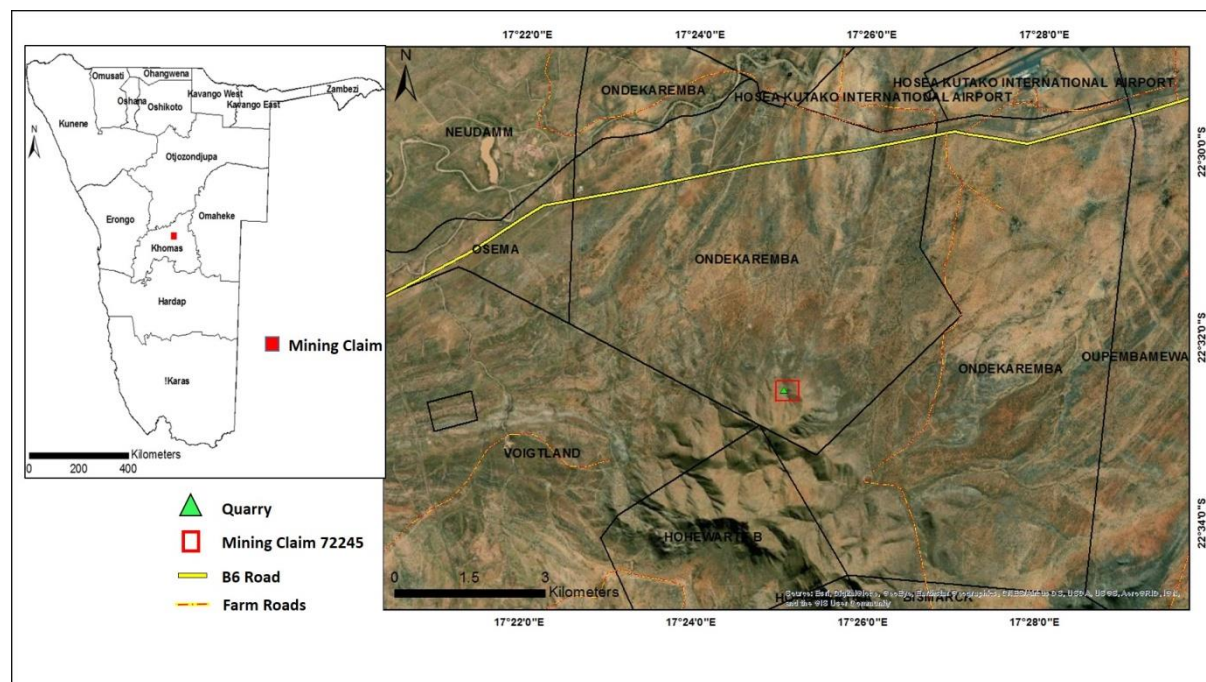


Figure 1-1. Location of mining claim 72245 and project site

Table 1-1. Approximate GPS corner coordinates for MC 72245

MINING CLAIM CORNER COORDINATES:	
•	22.54239°S/ 17.41606°E
•	22.54586°S/ 17.43264°E
•	22.54586°S/ 17.42025°E
•	22.54233°S/ 17.442031°E

## 1.3 The Proponent

Mining Claim 72245 belongs to Eagle Focus Investments cc, and the proposed quarrying and crushing activities will be undertaken by the same entity.

## **1.4 The Environmental Consultant**

Omavi Geo-technical and Geo-environmental consultants cc (hereinafter referred to as Omavi Consultants or OGGC) has been appointed by the proponent to act on their behalf as an independent environmental consultant to carry out an Environmental Assessment (EA) and submit the required documents as part of the application for an Environmental Clearance Certificate (ECC) to the Department of Environmental Affairs (DEA).

The Environmental Scoping Assessment (ESA) was conducted by a qualified and experienced environmental practitioner, whose detailed curriculum Vitae (CV's) is provided in **Appendix B** of this document.

## **1.5 The Environmental Assessment Process**

The assessment process followed in undertaking this environmental assessment can be summarized as follows:

1. Project screening process – This entailed preparation of the Background Information Document (BID) and ECC Application and their submission to the Office of the Mining Commissioner in the Ministry of Mines and Energy (MME) (Competent Authorities) for notification and recommendations. The date stamped copy of the ECC Application from the MME was uploaded to the MEFT's EIA online portal for registration (**Application number 002139**) and notification of the commencement of the EA process.
2. Invitation / notices to stakeholders (I&APs) and the public to participate in environmental assessment process issued through local newspaper advertisements as well as via direct emails communications to key stakeholders and authoritative institutions such as Line Ministries, Regional and Local Governments, and affected Traditional authority and farm/land owners or occupiers of land.
3. Compilation of the ESA report (consolidating all findings from the I&APs/public consultation, and based on the provided project information and research) and Environmental Management Plan (EMP), **Appendix H**.
4. Submission of the ESA report (and EMP including all appendices to the report) to the Department of Environmental Affairs and Forestry in fulfilment of all the requirements of the Environmental Impact Assessment (EIA) Regulations No. 30 of 2012 and the Environmental Management Act, (EMA), 2007, (Act No. 7 of 2007) for application of the Environmental Clearance Certificate (ECC) for the proposed project.
5. Notification of all registered Interested and Affected Parties (I&APs) confirming that the ESA and EMP have been submitted to the MEFT's EIA online portal for public review.

The overall environmental assessment process followed is illustrated schematically in **Figure 1-2**.

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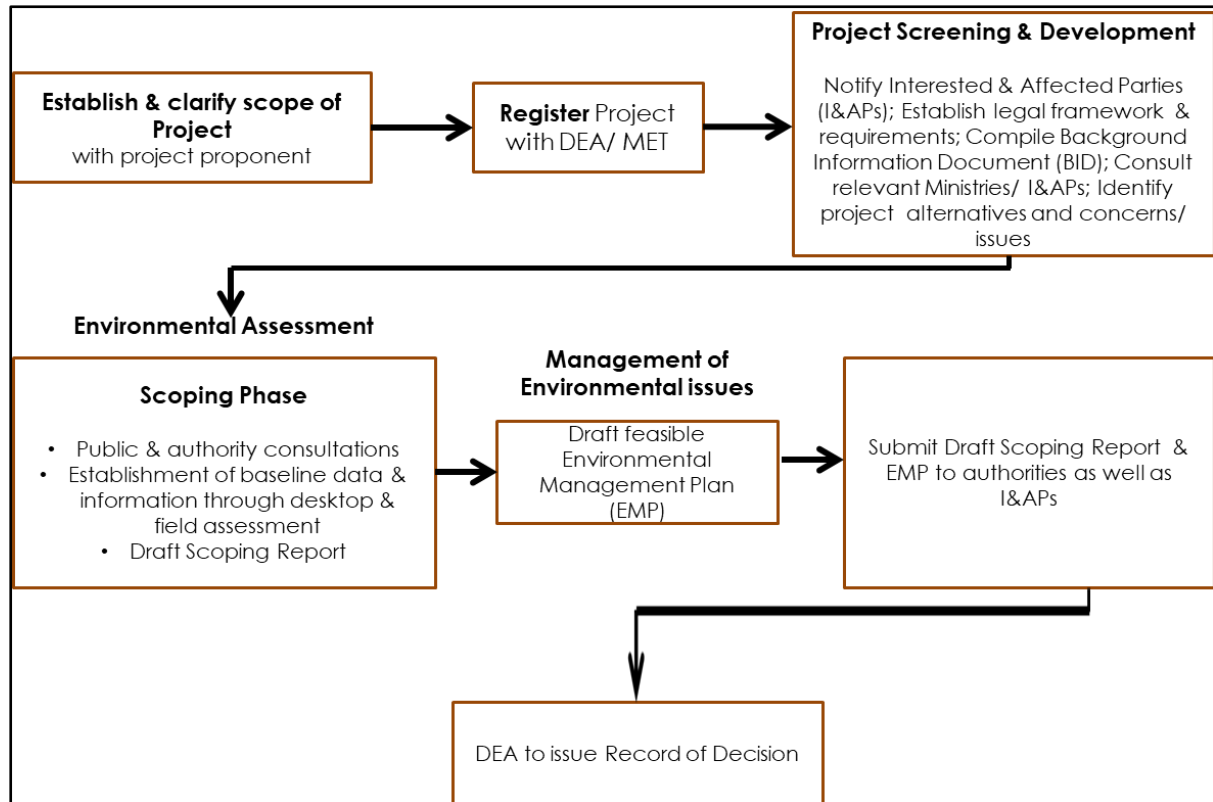


Figure 1-2. Schematic process flow of the Environmental Assessment Process Followed

## **2 PROJECT DESCRIPTION, ACTIVITIES AND PROCESSES**

The proposed project entails three stages, namely: the development phase, the operational phase and the decommissioning phase. The development stage will entail surface clearing of vegetation, overburden stripping, the establishment of a small-scale quarry and a 180 tons per hour static and mobile crushing plant plus the erection/ installation of support infrastructures such as stockpile bays, a small mobile weigh bridge, a small container workshop, and a small container office with temporary ablution facilities. The operational stage will kick in as soon as the above facilities have been developed and will include ongoing quarrying and crushing of durable quartzite rock, and subsequent stockpiling and distribution of construction aggregates.

During the operational phase quarrying will involve a combination of overburden stripping, followed by controlled drilling and blasting of quartzite rock, and ultimately bulk excavation of loose boulders. The excavated material will then be hauled from the quarry to a tipping bin and primary crusher, from where further down-sizing and beneficiation starts. Rehabilitation of the quarry will be executed on an ongoing basis through backfilling and rock blinding with waste rock, and covering up such areas with topsoil.

At the primary crusher boulders from the quarry will be subjected to the first stage of crushing, and potentially to scalping, whereby fines and potentially deleterious material are removed in order to improve crusher efficiency. The undersize from the scalping process shall then be processed into a product of lesser quality, e.g. G6 and beyond. The oversize material shall be diverted to a different route where it will be subjected to a series of crushing stages, including impact, primary, secondary and tertiary crushing to produce a semi-final product. This semi-final product will then be sieved through a series of vibrating screens to get rid of deleterious fines.

The final product will then be stockpiled into individual heaps comprising aggregates of different sizes as listed below, ready to be dispatched and transported to the market place:

- 37.5 mm stone
- 19 mm stone
- 13 mm stone
- 9 mm stone and
- Crusher dust

Due to the massive quartzite deposit available on the concerned mining claim, the quarry is anticipated to have an active life of mine exceeding 20 years.

At the end of the life of the quarry the decommissioning phase will further entail the dismantling of all infrastructures, landscaping of all disturbed areas and subsequent disbursement of seed rich topsoil over reclaimed areas.

## **2.1 Resource Inputs (Development and Operational Phases)**

Clearing of the quarry site and associated working areas (e.g. processing plant area, stockpile bays, site office, site workshop, and emergency assembly) as well as overburden stripping will require the use of two (2) wheeled front-end loaders, two (2) excavators, a bulldozer and one (1) articulated dump truck (ADT) plus a few tipper trucks. On the contrary, the crushing process will be carried out using a combined set of Jaw and cone crushers, screens, a VS350E fitment to ensure that the final products are cubical and not flaky, and conveyor systems to produce approximately 180 tons/ hour of construction aggregates. The crushing plant, site office, small container workshop, shade structure near the working area, onsite temporary ablution facilities, mobile weigh bridge, and all mobile plant will be powered by a diesel generator to be installed on site. Diesel for power generation on site and for all mobile plant will be stored on site, in a 18000L fixed diesel tank. Water supply for domestic consumption will be sourced from a single borehole to be drilled near the quarry site. Two (2) 10 000L storage water tanks will be installed near the crushing plant to store abstracted water and/ or water harvested during the rainy season for production purposes. The anticipated daily water demand during the operational phase will vary between 3000L and 4500L, depending on numerous factors such as the amount of fines contained in the raw material, daily temperature, etc. Water used during the production process will be recycled to ensure that abstraction from the planned borehole is minimized.

It is anticipated that between 10 and 15 people will work on the site during normal operations.

## **2.2 Resource Outputs**

The final products from the proposed quarrying and crushing activities will include the following:

- 37.5 mm stones
- 19 mm stones
- 13 mm stones
- 9 mm stones and
- Crusher dust

## **3 PROJECT ALTERNATIVES**

This section explores alternatives that were considered and weighed in this scoping assessment, and lists those deemed to be most feasible. The viability of the selected alternatives/options is based on those that were found to be less damaging to the environment, while maximizing potential benefits from the proposed activities.



## Environmental Assessment Report: Quarrying & Crushing Activities on Mining Claim 72245

According to the 2012 EIA Regulations the definition of the “alternatives”, in relation to a proposed activity, refers to different means of generally meeting the same purpose and requirements of a proposed activity, which may include alternatives to –

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

The concept of considering alternatives thus ensures that the environmental assessment process is not reduced to the defence of a single project proposal that is to the desire of the proponent, and therefore, provides an opportunity for unbiased considerations of options, to determine the most optimal course of action from an environmental perspective.

Alternatives weighed and considered for this project are with regards to:

- Project location.
- Quarrying and crushing methods and technologies
- Supporting infrastructure during different stages of the project.
- The “No-action” alternative.

### 3.1.1 Limitations to the Project Alternatives

In evaluating alternatives to each of the above-listed aspects, the following factors were considered in line with best practice procedures as outlined under DEAT (2004):

- **Resource locality** – where alternative locations could be considered for the same resource and such alternatives are justified by economics.
- **Technological limitations** - where high costs or the environmental unfriendliness of a technology may prevent it from being considered as a viable option, or the lack of technological development may preclude certain options from consideration
- **Environmental limitations** – where environmental factors such as climate, geology, hydrology, hydrogeology, potential impacts on the local ecology may prevent or favour consideration for an option.
- **Socio-economic limitations** – where socio-economic factors such as distance to market, availability of infrastructure, current and future land-use, cultural significance, presence of archaeological sites and impacts on livelihoods may hinder or enhance consideration for an option.

### **3.1.2 Project Location Alternative**

The locations of mining claims for natural stone are principally dictated by the spatial distribution of the rock type(s) of interest, which in turn is primarily determined by geological and geotechnical conditions. The Proponent chose to explore and quarry the quartzite host rock found on mining claim 72245 because of its massive spatial distribution, thickness, durability, and the proximity of the site to Windhoek and the B6 main road.

During the rock mass targeting or siting process, an alternative location with similar rock deposits and in areas close enough to the much needed road infrastructure could not be found. Furthermore, the proponent is restricted to only perform quarrying activities on mining claims which they legally own through permission granted by the custodian Ministry of Mines and Energy and the directly affected land owner(s). In reflection of the above, an alternative location for the proposed activities could not be found.

### **3.1.3 Alternatives to quarrying and crushing methods and technologies**

The primary quarrying method to be adopted will involve controlled drilling and blasting, followed by bulk excavation of the loosened raw material, and ultimately trimming of excavated blocks to the crushing plant either by haul dump trucks or conveyor systems; depending on the distance from the quarry to the tipping bins. Crushing on the hand will be carried out by means of composite crushing and screening (or sieving) to produce construction aggregates of the desired particle sizes. These are the most conventional and most practical method (from an efficiency and economic view point) used in the local industry, and as such no alternatives considered proved to be better than these methods and technologies.

### **3.1.4 Alternatives to support services infrastructure**

Alternatives were considered for the different support infrastructures planned to ensure that the most feasible options were selected. Due consideration was given to technological, economic, and environmental limitations in selecting the most feasible option. The alternatives considered in this regard are presented in **Table 3-1** below.

**Table 3-1. Service infrastructure alternatives considered for this project**

<b>Category of Infrastructure</b>	<b>Alternatives Considered</b>	<b>Justification for selected option</b>
Crusher Technology	Jaw Crusher	-Jaw crusher technology preferred because it has a large receiving opening; its shape of receiving opening is favourable for blocky feed; it is more easily adjusted; it can handle sticky
	Gyratory Crusher	

## Environmental Assessment Report: Quarrying & Crushing Activities on Mining Claim 72245

Category of Infrastructure	Alternatives Considered	Justification for selected option
		feed better; and it is more capable of crushing hard rock
Ablution facilities	Install fixed facility with septic tank	-To avoid long-term visual impacts & minimize rehabilitation costs portable facilities were selected as the best option
	Portable facilities with septic tank	
Water supply	Use existing boreholes if any available on site	-During development phase use water from existing farm borehole  -During operational phase abstract water daily or weekly (depending on available storage capacity) from new borehole
	Drill new borehole	
	Bring water from elsewhere	
Diesel storage	Install fixed above-ground diesel tank on site	-Use fixed diesel tank installed on a concrete floor and contained in a concrete bund wall. Risk of environmental pollution from potential oil spillages is lower as a fixed tank is limited to one area and hence spillages can be controlled with ease
	Trailer mounted diesel tank	
Power supply	Diesel generator	-Most practical & economically option during both development and operational phase is to use diesel generator  -Installation of solar plant and connection to grid currently not viable due to high CAPEX and uncertainty with regards to product demand. These options may be considered in the long run if growth in product demand is proven or justified
	Install photovoltaic solar panels	
	Connect to nearest 3-Phase grid	
Container Site Office and Workshop	Erect dis-mantlable prefabricated container	Favoured option due to: (a) Ease of installation, (b) Low installation costs and (c) Ease of dismantling & moving
	Erect Permanent buildings	Lease favoured & unlikely due to high CAPEX and long terms visual impact
	Offices off-site	Not ideal or preferred as office need to be at production site to enable ease of demonstrating products to potential clients, and monitoring production

Category of Infrastructure	Alternatives Considered	Justification for selected option
		volume/ tonnages
Weigh Bridge	Fixed/ static weigh bridge	Not preferred due to high installation costs and less flexibility
	Mobile weigh bridge	Preferred option due to lower installation costs and ease of moving
Stockpile bays	Stockpile bays on site	Most favoured option due to available and cheap storage space, and will ensure that all damage due to site clearance will be contained on site
	Stockpile bays off site	Least favoured option due to lack of storage space elsewhere, and the fact that this may introduce further damage elsewhere

### **3.1.5 No-Go Alternative**

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

This option was considered and a comparative assessment of the environmental and socio-economic impacts of the “no action” alternative was undertaken to establish what benefits might be lost if the project is not implemented. The key losses that may never be realized if the proposed project does not go ahead include:

- Potential continued shortage of construction aggregates in the Windhoek area
- Lost opportunity for foreign direct investment.
- Employment for about 10 to 15 people will not be realized.
- Loss of potential income to local and national government through land lease fees, license lease fees and various tax structures.
- Socio-economic benefits such as skills acquisition to local community members, borehole upgrades, etc would be not realized.
- No business boost for local transport sub-contractors

Considering the above losses, the “no-action/go” alternative was not considered a good option for socio-economic development. Hence, this option was dismissed.

The project activities and their alternatives described above are governed by certain legislations and these need to be complied with throughout the project life cycle. The applicable/relevant legislations, policies and guidelines are presented under the next chapter.

## **4 APPLICABLE LEGAL FRAMEWORK, POLICIES AND GUIDELINES**

### **4.1 National Legislation**

In Namibia all mineral rights are vested in the state and are regulated by the Ministry of Mines and Energy (MME) whereas sustainable exploitation and management of the environment and use of natural resources is regulated by the Ministry of Environment, Forestry and Tourism (MEFT).

The Minerals Prospecting and Mining Act (Act No. 33) of 1992 is the principal act governing exploration and mining of mineral resources in the Republic of Namibia. From an environmental management viewpoint, this Act stipulates the undertaking of an environmental impact assessment during prospecting or mining/ quarrying operations, coupled with the development of implementable environmental management and monitoring plans where any pollution is anticipated. The Ministry of Mines and Energy is the custodian agency for the administration of the Mining Act.

Conversely, MEFT is the overseeing custodian agency for the administration and enforcement of the EMA, with the enforcement of the Environmental Impact Assessment Regulations of 2012 specifically being entrusted with the Department of Environmental Affairs and Forestry within MEFT. This Act stipulates that possession of an Environmental Clearance Certificate is a pre-requisite for issuing any license or permit by any authority for any activities related to listed activities under the Environmental Impact Assessment Regulations of 2012. The act further sets out under Section 58 and in the Government Notice No. 29 of 2012 a detailed framework and schedule for conducting Environmental Impact Assessments for mining companies or any entity that plans to undertake quarrying or mining at any scale.

A review of 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 for them to carry out the proposed activities. The applicable local (national) and where necessary international legislation, policies and guidelines are given in **Table 4-1 and Table 4-3**.

## Environmental Assessment Report: Quarrying & Crushing Activities on Mining Claim 72245

Table 4-1. Applicable legislation, policies and guidelines to the proposed quarrying and crushing activities

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
<b>Relevant Acts</b>		
The Constitution of the Republic of Namibia (1990)	Government of the Republic of Namibia	<p>The Namibian government has adopted several policies that promote sustainable development. Most of these originate in clauses of the Constitution of the Republic of Namibia. In Article 95 (i), the State undertakes to actively promote and maintain the welfare of the people by adopting policies aimed at the utilisation of natural resources on a sustainable basis for the benefit of all Namibians. Articles 91(c) and 95(l) are also of relevance to sound environmental management practice. In summary, these refer to:</p> <ul style="list-style-type: none"> <li>• Guarding against over-utilisation of biological natural resources.</li> <li>• Pursuing sustainable natural resource use</li> <li>• Limiting over-exploitation of non-renewable resources.</li> <li>• Maintaining biological diversity</li> <li>• Ensuring ecosystem functionality.</li> <li>• Protecting Namibia's sense of place and character.</li> </ul> <p>Through implementation of the mitigation measures set out in this Scoping Report (ESA) and the accompanying Environmental Management Plan (EMP), the owner of the ECC shall be advocating for sound environmental management as set out in the Constitution.</p>
Environmental Management Act No. 7 of 2007 and its 2012 EIA Regulations Government Notice 28-30	MEFT: DEA	<p>Part 2 of the Act sets out 12 principles of environmental management, summarized as follows:</p> <ul style="list-style-type: none"> <li>• Community involvement in natural resources management, must be promoted and facilitated.</li> <li>• The participation of all I&amp;APs must be promoted and decisions must consider the interest, needs and values of I&amp;APs.</li> <li>• Equitable access to environmental resources must be promoted and the functional</li> </ul>

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LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
(Government Gazette 4878		<b>Relevant Acts</b>
		<p>integrity of ecological systems must be considered to ensure sustainable systems.</p> <ul style="list-style-type: none"> <li>• Assessments must be undertaken for activities which may have significant effects on the environment or the use of natural resources.</li> <li>• Sustainable development must be promoted in all aspects relating to the environment.</li> <li>• Namibia's cultural and natural heritage including, its biological diversity, must be protected and respected.</li> <li>• The option that provides the most benefit or causes the least damage to the environment, at a cost acceptable to society must be adopted to reduce the generation of waste and polluting substances at source.</li> <li>• The reduction, re-use and recycling of waste must be promoted.</li> <li>• A person who causes damage to the environment must pay the costs associated with rehabilitation of damage to the environment and to human health caused by the pollution.</li> <li>• Where there is sufficient evidence which establishes that there are threats of serious or irreversible damage to the environment, lack of full scientific certainty may not be used as a reason for postponing cost-effective measures to prevent environmental degradation; and</li> <li>• Damage to the environment must be prevented and activities which cause such damage must be reduced, limited, or controlled.</li> </ul> <p>The proponent has the responsibility to ensure that the proposed activity, as well as the ESA process, conforms to the principles of this Act. In developing the ESA process, OGGC has been cognizant of these requirements, and accordingly the ESA process has been undertaken in conformance with this Act and the EIA Regulations (2012). Several listed activities in terms of</p>

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LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
<b>Relevant Acts</b>		
		the Act, are triggered by the proposed activities.
Mineral Prospecting & Mining Act (Act no. 33 of 1992)	MME	<p>Sections 50, 52, 54, 57 and 130 of this Act sets out provisions for environmental management for activities arising from mineral exploration and mining, as follows:</p> <ul style="list-style-type: none"> <li>• That the mineral license holder is required to prepare an ESA or EIA and an EMP and make revision of such EMP from time to time</li> <li>• That the mining license holder is liable to pay compensation where in course of the mining operations; any damage is done to the surface of land, water source, cultivation, building or any other structure</li> <li>• That the holder of a mineral license cannot exercise any rights on a private land until the holder has entered into an agreement with the owner regarding payment of compensation</li> <li>• That the license holder shall take all necessary remedial steps to reasonable satisfaction of the minister for any damage caused by any mining operations on closure of mines.</li> <li>• That the minister is empowered to direct the mineral license holder for carrying out good reconnaissance, mining and prospecting practices for the protection of the environment, and conservation of natural resources payment of liability fees and royalty and remedial steps for any damages and</li> <li>• That the mineral or mining license holder shall report pollution in course of any mining or prospecting operations and make remedial measures for such.</li> </ul> <p>The abovementioned provisions are all relevant to the proposed activities and were thus considered in the ESA process and drafting of the EMP.</p>
Charter for Sustainable and	The Namibian Chamber of Mines of Namibia	This charter aims to facilitate meaningful participation of historically deprived Namibians in the



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LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
<b>Relevant Acts</b>		
Broad-Based Economic and Social Transformation in the Namibian Mining Sector 2014 – 2020 (The Namibian Mining charter)		mining industry. It has effectively been developed as an instrument to effect transformation and sets specific targets for mineral license holders active in Namibia
The Minerals Policy of Namibia, 2003	Ministry of Mines and Energy	This policy sets out guiding principles and directions while communicating the values of the Namibian people in pursuit of the development of the mining sector.
Pollution Control & Waste Management Bill	MEFT and others	<p>This Bill serves to regulate and prevent the discharge of pollutants to air and water as well as providing for general waste management. The Bill repeals the Atmospheric Pollution Prevention Ordinance (11 of 1976). In terms of water pollution, it will be illegal to discharge of, or dispose of, pollutants into any watercourse without a Water Pollution Licence (apart from certain accepted discharges). Similarly, an Air Quality Licence will be required for any pollution discharged to air above a certain threshold. The Bill also provides for noise, dust or odour control that may be considered a nuisance. The Bill advocates for duty of care with respect to waste management affecting humans and the environment and calls for a waste management licence for any activity relating to waste or hazardous waste management.</p> <p>The proposed quarrying of quartzite would not entail the discharge of large quantities of gaseous pollutants into air but might result in increased noise levels and dust generation during operations.</p>
Water Act (No. 54 of 1956)	MAWLR: Department of Water Affairs : <b>Mr Franciskus Witbooi</b>	Makes provision for several functions pertaining to the management, control and use of water

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LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
<b>Relevant Acts</b>		
	<p><b>(Deputy Director: Water Policy and Water Law Administration. Tel: (061) 208 7158</b></p>	<p>resources, water supply and the protection of water resources.</p> <p><b>The Proponent should prevent any potential pollution of groundwater and surface water. Water should be used in a sustainable way. A water abstraction permit will be required from the Department of Water Affairs prior to drilling any water borehole and abstracting water from a borehole.</b></p>
<p>Water Resources Management Act (Act No. 11 of 2013)</p>		<p>This Act provides a framework for managing water resources based on the principles of integrated water resources management. It provides for the management, development, protection, conservation, and use of water resources. Should the proponent wish to undertake activities involving water abstraction and/or effluent discharge, the relevant permits will have to be applied for. Of utmost importance are Sections of the Water Resources Management Act No. 11 of 2013 that pertain to the protection of groundwater and aquifers. These are Section 63 (Wastage of groundwater), 64 (License to dispose of groundwater abstracted from mine or underground work), 66 (Protection of aquifers) and 68 (Pollution control).</p> <p><b>Provision for a Groundwater abstraction and use permit for commercial use to be applied for and obtained from the Department of Water Affairs (DWA): Directorate of Water Resources Management. When issued, the permit should be renewed as required (as stipulated in therein).</b></p> <p>Furthermore, any watercourse on/or near the site and associated ecosystems should be protected in alignment with the principles above. Mitigations measures were included in the EMP to reduce impacts on watercourses that could not be avoided</p>
<p>Nature Conservation Ordinance (Act No. of 1996)</p>	<p>MEFT</p>	<p>The Nature Conservation Amendment of 1996 (section 73.1) provides for an economically based system of sustainable management and utilization of game in communal areas; to delete references to representative authorities; and to provide for matters incidental hereto.</p>

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LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
<b>Relevant Acts</b>		
		<p>Although the proposed site for development is not located within protected areas, there is indigenous vegetation on the sites and therefore this Ordinance is relevant. A permit is required should any species onsite, with a protected or endangered status, be damaged or removed. If required, the proponent will apply for such a permit prior to commencing with the proposed activities.</p>
<p>Local Authorities Act No 23 of 1992</p>	<p><b>Contact Person Ms. Mary-Anne Kahitu (Manager: Health &amp; Environment Services)</b>  <b>Tel: 061 290 2485</b>  <i>With all official correspondence addressed to the office of the Chief Executive Officer (P. o. Box 59 Windhoek)</i></p>	<p>The City of Windhoek (Windhoek Municipal Council) is the responsible Local Authority of the affected project site area, and therefore they should be consulted in compliance with the Act and its Regulations, as relevant to the proposed project.</p>
<p>Forestry Act (Act No. 12 of 2001)</p>	<p>MEFT: <b>Permits are required for the removal of protected plants species.</b>  <b>For the project site areas outside the jurisdiction of the City of Windhoek, the Proponent should contact Forestry Office (Ministry of Agriculture, Water and Land Reform)</b>  <b>Mr Joseph Hailwa (Director: Forestry)</b>  <b>Tel: (061) 208 7663</b>  <b>For the project site areas within the jurisdiction of the City of Windhoek (exploration sites falling under the city boundaries), a permit should be obtained from the Health and Environment Division of the Windhoek Municipal Council (City of</b></p>	<p>The Act provides for the management and use of forests and forest products.</p> <p>Section 22. (1) provides: "Unless otherwise authorised by this Act, or by a licence issued under subsection (3), no person shall on any land which is not part of a surveyed even of a local authority area as defined in section 1 of the Local Authorities Act, 1992 (Act No. 23 of 1992) cut, destroy or remove - (a) vegetation which is on a sand dune or drifting sand or on a gully unless the cutting, destruction or removal is done for the purpose of stabilising the sand or gully; or (b) any living tree, bush or shrub growing within 100 m of a river, stream or watercourse."</p> <p>The proponent will apply for the relevant permit under this Act if it becomes necessary.</p>

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LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
<b>Relevant Acts</b>		
	<p><b>Windhoek)</b> Tel: Environmental Department (061) 290 3541 OR 290 2911 (switchboard)</p>	
<p>Soil Conservation Act (Act No. 76 of 1969)</p>	<p>MAWLR</p>	<p>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.</p> <p>This Act is applicable since stripping of topsoil will take place to expose the targeted rock units. Mitigation measures are included in the EMP to preserve topsoil and reduce impacts on topsoil.</p>
<p>Regional Councils Act (Act No. 22 of 1992)</p>	<p>MURD</p>	<p>The Regional Councils Act legislates the establishment of Regional Councils that are responsible for the planning and coordination of regional policies and development.</p> <p>The main objective of this Act is to initiate, supervise, manage, and evaluate development in the regions.</p> <p>The relevant Regional Council for this project is the Khomas Regional Council which is an I&amp;AP and has been provided with the opportunity to comment on the proposed project.</p>
<p>Petroleum Products and Energy Act (No. 13 of 1990) Regulations (2001)</p>	<p>MME: Petroleum Affairs Division</p>	<p>Regulation 3(2)(b) states that "No person shall possess or store any fuel except under authority of a licence or a certificate, excluding a person who possesses or stores such fuel in a quantity of 600 litres or less in any container kept at a place outside a local authority area.</p> <p><b>This law is applicable to this project because diesel will be stored on site at any given point in</b></p>

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LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
<b>Relevant Acts</b>		
		<b>time to support the power generator and all plant.</b>
The Road Traffic and Transport Act (No. 22 of 1999)	MWT: Roads Authority	<p>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.</p> <p><b>Should the proponent wish to undertake activities involving road transportation or access onto existing roads, the relevant permits will be required. The law nonetheless applies to this project as all truck and plant operators/ drivers would need to be licensed.</b></p>
National Heritage Act (Act No. 27 of 2004)	MEAC	<p>The Act makes provision for the protection and conservation of places and objects of heritage significance and the registration of such places and objects. Part V Section 46 of the Act prohibits removal, damage, alteration or excavation of heritage sites or remains, while Section 48 sets out the procedure for application and granting of permits such as might be required in the event of damage to a protected site occurring as an inevitable result of development. Part VI Section 55 Paragraphs 3 and 4 require that any person who discovers an archaeological site should notify the National Heritage Council. Section 51 (3) sets out the requirements for impact assessment.</p> <p><b>No objects of heritage concern were noted onsite. However, should any objects of heritage/ archaeological significance be identified during project activities, the work must cease immediately in the affected sites and the necessary steps taken to seek authorization from the Council.</b></p>
Public Health Act (Act No. 36 of 1919)	MoHSS: Occupational Health	The Act serves to protect the public from nuisance and states that no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which

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LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
<b>Relevant Acts</b>		
		<p>he is in charge any nuisance or other condition liable to be injurious or dangerous to health.</p> <p>The proponent should ensure that the facility is designed and operated in a way that is not unsafe, or injurious or dangerous to public health and that the noise and dust emissions which could be considered a nuisance remain at acceptable levels. This will be applicable during the development and operational phases of the proposed project to the employees but not so much to landowners as farmhouses and settlements are located far away from where quarrying and crushing will take place.</p>
Labour Act, 2007	MLIEC	<p>Sections 3, 4, 5, 11, 16, 23-27, 44 and 135 make provision for the following:</p> <ul style="list-style-type: none"> <li>• That a person may not employ a child under the age of 14years</li> <li>• That children are prohibited for employment in a mine and other dangerous circumstances</li> <li>• That forced employment of persons is prohibited</li> <li>• That an employee is entitled to monetary remuneration daily, weekly, fortnightly, or monthly in cash, cheque, and direct deposit into a bank account</li> <li>• That the work hours of an employee are 45 hours in a week, over and above which an employee is entitled to additional payment overtime wage</li> <li>• That employees are entitled to (a) annual leave on the basis of the average number of days worked over the year, (b) a day's sick leave for every 26days worked, (c) compassionate leave for a period of 5days in 12 months which is fully paid, and (d) leave on public holidays,</li> <li>• That female employees that have completed 6 months of employment are entitled to 12 weeks of maternity leave, which can be extended for a further period of one</li> </ul>

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LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
<b>Relevant Acts</b>		
		<p>month</p> <ul style="list-style-type: none"> <li>• That the minister is empowered to make regulations in relation to safety, health, hygiene, sanitation, and welfare of persons employed in or about mines, including sea-bed operations</li> </ul> <p>The proponent is expected to be compliant with the above provisions and as such the above provisions were accounted for in the ESA report and EMP.</p>
<b>Relevant Policies and Regulations</b>		
Environmental Assessment Policy (1994)	MEFT: DEA	This policy aims to promote sustainable development and economic growth while protecting the environment in the long term by requiring environmental assessment prior to undertaking of certain activities. Annexure B of the policy contains a schedule of activities that may have significant detrimental effects on the environment, and which require authorization prior to undertaking. <b><u>Please see Table 4 for a summary of the activities that would require authorization for the proposed quarrying and crushing of natural stone to produce construction aggregates.</u></b>
Mine Health & Safety Regulations (under section 138A of the Mining Act, 1992)	MME: Mine Safety & Services Division  MoHSS: Occupational Health Division	These set of regulations are aimed at ensuring that mines are operated in a safe manner to prevent fatalities, injuries, and long-term health hazards. The regulations make provision for: <ul style="list-style-type: none"> <li>• Employee's right to leave unsafe working places</li> <li>• Obligation of a mine manager to provide for all safety measures in a mine or quarry</li> <li>• Reporting of accidents to the chief inspector and keeping a record of such accidents</li> <li>• Requirements for the mine manager to provide occupational health services at area of mining activity</li> <li>• Requirements for stability of excavations; provision of waiting areas; provision of fencing and gates; schemes for working in vicinity of water body.</li> </ul>

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LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
<b>Relevant Acts</b>		
		<ul style="list-style-type: none"> <li>• Provision for mine dump or mine tailings facility</li> <li>• Ensuring that all parts of a mine are well ventilated with minimum standards of air quality</li> <li>• The mine manager's responsibility to formulate a scheme for safe movement of vehicles being use in the mine/ quarry</li> <li>• The mine manager's responsibility to formulate a scheme for identifying hazards at the area of mining activity and provision of appropriate protective equipment</li> <li>• Ensure that the mine manager provides first aid and firefighting equipment and procedures where exploration/ quarrying activities are being conducted</li> </ul> <p>All the above-mentioned provisions are relevant to this project and were thus considered in the ESA process and EMP.</p>
Atmospheric Pollution Prevention Ordinance (1976)	MoHSS	This ordinance provides for the prevention of air pollution and is affected by the Health Act 21 of 1988. Under this ordinance, the entire area of Namibia, apart from East Caprivi, is proclaimed as a controlled area for the purposes of section 4(1) (a) of the ordinance.
Hazardous Substance Ordinance, No. 14 of 1974	MoHSS	<p>The ordinance provides for the control of toxic substances. It covers manufacture, sale, use, disposal and dumping as well as import and export. Although the environmental aspects are not explicitly stated, the ordinance provides for the importing, storage, and handling.</p> <p>This Ordinance is relevant to the project under review as potentially toxic substances such as blasting powder and drilling fluids will be utilized during the operational phase of the project.</p>
Road Ordinance 1972 (Ordinance 17 of 1972)	MWT: Roads Authority	<p>Width of proclaimed roads and road reserve boundaries (S3.1) Control of traffic on urban trunk and main roads (S27.1)</p> <p>Infringements and obstructions on and interference with proclaimed roads. (S37.1)</p>



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LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
<b>Relevant Acts</b>		
<p>Waste Management Regulations of Windhoek Municipal Council</p>	<p><b>Ms. Mary-Anne Kahitu (Manager: Health &amp; Environment Services)</b>  <b>Tel: 061 290 2485</b>  <i>With all official correspondence addressed to the office of the Chief Executive Officer (P. o. Box 59 Windhoek)</i></p>	<p>The Proponents should familiarize themselves with the specific City of Windhoek's Regulations with regards to managing waste (both solid and liquid) on the project sites and where to dispose it.</p> <p>This will also entail the process to apply for permission to dispose off waste on designated Municipality landfill/waste sites within the municipality's boundaries such as the Kupferberg landfill site located west of Windhoek.</p>
<p>The Drainage Regulations of the Windhoek Municipality Council</p>	<p>Department of Infrastructure, Water and Technical Services</p>	<p>The Drainage Regulations of the Windhoek Municipality Council foster for safe disposal and manage of sewage and wastewater in order to prevent deterioration of both surface and groundwater bodies. Hence, all designs pertaining to the recycling, reuse and disposal of wastewater from the crusher plant, production drilling and any sewage management should comply with these regulations</p>
<p>Noise Control Regulations of the Windhoek Municipality Council, 2006</p>	<p><b>Ms. Mary-Anne Kahitu (Manager: Health &amp; Environment Services)</b>  <b>Tel: 061 290 2485</b>  <i>With all official correspondence addressed to the office of the Chief Executive Officer (P. o. Box 59 Windhoek)</i></p>	<p>The project activities are expected to produce a certain level of noise from sound emitted by running engine powered or motor driven equipment (e.g. drilling rigs, crusher plant, earth moving machinery, etc), and from blasting</p> <p>Then proponent is expected to comply with the regulations by maintaining noise levels below a certain threshold as stipulated under the Mine Health and Safety Regulations; providing adequate and appropriate PPE; and ensuring timely communication or notice to immediately affected land users for activities that produce enormous noise such as blasting.</p>

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**Table 4-2. Summary of relevant acts and applicability thereof (in terms of licenses, authorizations and or permits) as listed in the 2012 EIA Regulations**

ACTIVITY	DESCRIPTION OF ACTIVITY	RELEVANCE OF LISTED ACTIVITY
Activity no. 2.1	The construction of facilities for waste sites, treatment of waste and disposal of waste	The proposed activity will require development of stockpiles for waste rock not suitable for production as well as stockpiling of topsoil stripped off to access the targeted rock unit
Activity No. 3.1	The construction of facilities for any process or activities which requires a license, right or other form of authorization, and the renewal of a license, right or other form of authorization, in terms of the Minerals (Prospecting & Mining Act), 1992	The proposed project will entail rock quarrying and crushing activities, both of which require environmental clearance and prospecting/ mining permitting prior to commencement as per the EMA
Activity No. 3.2	Other forms of mining or extraction of any natural resources whether regulated by law or not	The proposed project would require surface clearing and excavation over the footprint of the targeted rock unit, followed by subsequent drilling, blasting and bulk excavation of the targeted host rock unit, and lastly, down-sizing of the quarried rock through crushing and screening to produce suitably graded construction aggregates.
Activity No. 3.3	Resource extraction, manipulation, conservation & related activities	
Activity No. 9.4	The storage and handling of a dangerous goods, including petrol, diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of more than 30 m <sup>3</sup> (30 000L) at any one location	Diesel will be stored on site in a trailer mounted tank to provide fuel to the power generator and all plant
Activity No.	The construction of – public roads	The proposed project may include the widening of existing access roads for access to

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ACTIVITY	DESCRIPTION OF ACTIVITY	RELEVANCE OF LISTED ACTIVITY
10.1 (b)		the site

## 4.2 International Treaties and Conventions

The international treaties and conventions applicable to the project are as listed in **Table 4-3** below.

**Table 4-3. International Treaties and Convention applicable to the project**

STATUTE	PROVISIONS	PROJECT IMPLICATIONS
The United Nations Convention to Combat Desertification (UNCCD)	Addresses land degradation in arid regions with the purpose to contribute to the conservation and sustainable use of biodiversity and the mitigation of climate change	The project activities should not be such that they contribute to desertification.
Convention on Biological Diversity 1992	Regulate or manage biological resources important for the conservation of biological diversity whether within or outside protected areas, with a view to ensuring their conservation and sustainable use.  Promote the protection of ecosystems, natural habitats, and the maintenance of viable populations of species in natural surroundings	Removal of vegetation cover and destruction of natural habitats should be avoided and where not possible minimised
Stockholm Declaration on the Human Environment, Stockholm (1972)	It recognizes the need for: "a common outlook and common principles to inspire and guide the people of the world in the preservation and enhancement of the human environment.	Protection of natural resources and prevention of any form of pollution.

## **5 DESCRIPTION OF THE RECEIVING ENVIRONMENT (BASELINE)**

This section provides an overview of the current status quo of the biophysical and socio-economic environment through the analysis of baseline data and information as deduced from field assessments, literature and community engagements. For this project the data has been collected through desktop studies on the national database, existing literature as well as site visits and consultation with the community and local authorities to verify the data that was collected remotely. This provides a baseline where changes that occur as a result of the proposed project can be measured and monitored through time.

### **5.1 Current Biophysical Environment**

The envisaged quarry and crushing plant site is located near the toe of a quartzite mountain on Farm Sonnleiten No. 78 which is part of the broader Ondekaremba farm. The Neudamm Agricultural College is located just north west of the mining claim area on Farm Neudamm. The area principally covers fenced farmland which is characteristic of the area.

#### **5.1.1 Climatic Conditions**

Data records from the Windhoek weather station for the period 2009 to 2019 was analysed to provide insight on climatic conditions around the project site. The data is based on records by the Namibia Meteorological Services. A summary of the analysis performed is provided below.

- Average annual temperatures for the Windhoek area ranged between 19 and 23 degrees Celsius between 2009 and 2019).
- The average annual rainfall on the other hand over the same ten year period ranged between 60 mm (recorded between January – November 2019) and 750 mm (recorded during 2011). Mendelsohn *et al.* (2009) reported the annual average rainfall for the Windhoek area to be between 300 and 350 mm.
- Relative humidity in the Windhoek area ranges between 51 and 61% during the most humid months and between 21 and 28% during the least humid months.
- Average annual rates of evaporation in the general Windhoek area generally range between 2100 and 2240 mm (Mendelsohn *et al.*, 2009).
- Wind data (Namibia Meteorological Services, 2019) suggests a prevailing easterly wind in the Windhoek area and surrounds for most of the year.

#### **5.1.2 Fauna and Flora**

The mining claim is located within the broader Savannah Biome, and the specific mining claim area falls within an area classified as Highland Shrubland, with the vegetation structure classified as shrubs and low trees (Mendelsohn *et al.*, 2009). This shrubland is home to a

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diversity of fauna and flora as documented below, after Mendelsohn *et al.* (2009) and Cunningham, 2010).

### 5.1.2.1 Flora

An estimated 65 species of larger trees and shrubs (>1 m) are known to occur in the general Windhoek area, and up to 100 species of grasses are expected to occur in the general Windhoek area. The most important shrub and tree species occurring in the general area are probably *Commiphora dinteri*, *Cyphostemma bainesii*, *Cyphostemma currorii* and *Heteromorpha papilosa* and the most important grass expected in the area is the endemic *Setaria finite* associated with drainage lines (Photo 1).



Photo 1. Typical Flora in the proposed project area

### 5.1.2.2 Fauna

According to Mendelsohn *et al.* (2009) and Cunningham (2010), the Highland Shrubland is home to a diverse range of reptile species, amphibians, mammals and birds.

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Amphibians: At least nine species of amphibians, of which two species are endemic and one species is classified as near threatened, can occur in suitable habitat in the general Windhoek area. The most important species are the endemic *Poyntonophrynus hoeschi* and *Phrynomantis annectens*. However, these species occur widespread in Namibia and are not exclusively associated with the general Windhoek area.

Mammals: There are at least 73 species of mammals that are known, or expected to occur in the general Windhoek area. Eight (11%) of these species are classified as endemic and 38% of the species are classified under international conservation legislation. The most important species from the general Windhoek area, other than the endemic species, are probably those classified under international legislation as rare (e.g. the Namibian Wing-gland Bat *Cistugo seabrai*, the Hedgehog *Atelerix frontalis* and the Black-footed Cat *Felis nigripes*) and vulnerable (e.g. the Pangolin *Manis temminckii*).

Birds: At least 209 species of terrestrial birds, of which ten species are endemic, occur or could occur in the general Windhoek area. The most important bird species occurring, or expected to occur in the general area include: Monteiro's *Tockus monteiri* and Damara Hombills *Tockus damarensis*, Ruppel's Parrot *Poicephalus rueppellii*, the Rosy-faced Lovebird *Agapomis roseicollis* and the Rockrunner *Achaetps pycnopygius*.

### 5.1.3 Geology and Soils

The claim area is entirely underlain by rocks belonging to the Damara Super-group i.e. the Aus Formation of the Hakos Group covering mostly the southern and southwestern parts of mining claim 72245. The remaining part of the claim area is covered the Ondekaremba Member (Durachaus Formation) of the Nosib Group. The Hakos Group is dominated by siliciclastic rocks including quartzites, graphite schist, mica schist, conglomerate and diamictites. Subordinate carbonate and amphibolites are also present. The Nosib Group forms the base of the Damara Supergroup and consists of feldspathic quartzites with localized basal conglomerates, finer-grained clastic rocks and meta-evaporites. In the Claim area the Aus Formation turbiditic quartzites vary from massive to thickly bedded to thinly bedded turbidites. Sedimentary structures preserved in the quartzites are parallel lamination, flute marks, convolute bedding, graded bedding and scoured bases. The Ondekaremba Member consists of pebble-bearing schists on uncertain stratigraphic position. Upper and lower layers of the member are thrust planes.

The aggregates will be produced from the Aus Formation quartzite that is thrust over the feldspathic schist of the Ondekaremba Member of the Durachaus Formation.

The area hosts soils that are shallow and susceptible to erosion during the rainy season.



**5.1.4 Additional bio-physical and social elements**

A summary of additional bio-physical and social elements of the receiving environment are presented in **Table 5-1** and **Photo 2** below.

**Table 5-1. Biophysical and socio-economic elements of the receiving environment**

SUMMARY OF BASELINE ENVIRONMENT			
BIO-PHYSICAL ENVIRONMENT		SOCIO-ECONOMIC ENVIRONMENT	
Topography	The area concerned is generally characterized by a gently undulating and low-lying terrain in the vicinity of the envisaged crushing plant, stockpile bays and site offices, and changes to a more rugged terrain at the quarry site	Land Use	The entire mining claim lies on private farm land.
Surface & Groundwater	The envisaged quarry and processing plant site lie at the toe of a hillside north draining tributary which transverse the mining claim. Moderately productive aquifer yields potable water according to Farmer.	Land Ownership	The Sonnleiten farm is currently used as a cattle ranch with vast grazing land. The farm is subdivided into several camps, and is truncated by an E-W running high voltage powerline to the north of the mining claim. Small stock and game are also kept on the farm
		Population Density & Distribution	A low population density (of 1 to 5 people per km <sup>2</sup> ) on

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			<p>private farm land</p> <p>No evidence of human settlement in the vicinity (i.e. within 15.km) of the planned quarry and crusher site</p>
		Economic activities	<p>Unemployment on the affected farm is low due to ongoing commercial farming activities. The local economy is mainly driven by farming and tourism activities</p>
		Infrastructure & Services	<p>The main B6 road between Windhoek and Hosea Kutako north of the mining claim area. Additionally, there is a good network of farm access trunk roads in the area</p> <p>Good Electricity and telecommunication network</p> <p>Neudamm agricultural college located about 7 km northwest of the mining claim area</p>





**Photo 2. Farm access, fences and powerlines observed in the proposed project area**

### **5.1.5 Archaeological and Heritage Sites**

A review of the National Heritage Council and the environmental information services database was conducted, and no known heritage sites were identified in the project area. In cases where heritage sites are discovered, either during the project's development or operational phase, the chance finds procedure will be used where appropriate measures will be undertaken as outlined in the accompanying EMP. All archaeological remains are protected under the National Heritage Act (2004) and will not be destroyed, disturbed or removed.

## **6 PUBLIC CONSULTATION PROCESS**

The Public Consultation process aims to ensure that all persons or organizations that may be affected or interested in the project are kept informed of potential issues and can register their views and concerns. Building from there, the process provides opportunities to influence the project design so that its benefits can be maximized, and potential negative impacts be minimized. The current best practice model is to engage in a process of continuous dialogue with the affected community and other stakeholders as plans for the project evolve and the environmental assessment is prepared. A high level of interaction is maintained, potential and real social and environmental impacts are identified, and stakeholder needs and concerns are discussed and wherever possible built into the planned activities of the project, including decision-making and management practices. Good consultation helps foster genuine and positive relationships with mutual respect, shared concerns and objectives between the company pursuing the development and the community.

The public participation facilitator's role is to facilitate that process of dialogue to ensure there is transparency and accountability in decision-making and public confidence in the proposed project and its management.

### **6.1 Registered Interested and Affected Parties (I&APs)**

At the beginning of the environmental assessment process, a list of stakeholders who needed to be informed about the proposed project was drawn up. As the public participation process evolved, this list of Interested and Affected Parties (I&APs) was continuously updated. A complete summary of the I&APs identified and registered for the project can be found in **Appendix D**. The pre-identified I&APs were informed about the ESA process by email and SMS. Some of the I&APs on the list provided registered their names during the one-on-one consultations held with farmers on Farm Sonnleiten and neighbouring farms.

Amongst key stakeholders identified and registered for the EA process were:

- **Central or national government:** Ministry of Environment, Forestry & Tourism, Ministry of Mines & Energy, Ministry of Agriculture & Land Reform, Ministry of Urban & Rural Development, National Heritage Council of Namibia (under the Ministry of Education, Arts & Culture)
- **Regional government:** Khomas Regional Council
- **Local authority and Parastatals:** City of Windhoek, Windhoek Rural Constituency, The Namibian Airports Company
- **Members of the public including land/farm owner or occupiers of land:** Attached Appendix D

## **6.2 First Round of Public Consultation: Summary of Activities Undertaken**

To ensure that the I&APs were adequately consulted and involved, the following activities were undertaken:

- A list of pre-identified I&APs was compiled. Further I&APs included representatives from government institutions (ministries, regional and local authorities) and representatives from non-governmental organisations (NGOs) such as the Botanical Institute of Namibia.
- A project notification letter was physically submitted to the affected landowner
- An email was circulated to all identified and registered I&APs on 23<sup>rd</sup> November 2020 announcing the commencement of the EA process and an invitation to register as an I&AP as well as to attend the public consultation meeting. Included in this email was the Background Information Document (BID) which provided a description of the proposed activities and the whole procedure of the EIA to be followed. A copy of this email trail is attached in **Appendix E**.
- Formal public notices announcing the commencement of the EA process and an invitation to register as an I&AP as well as to attend the public consultation meeting were placed in *Die Republikein*, *The Sun Newspaper* and *Allgemeine Zeitung* newspapers (dated 18<sup>th</sup> November 2020 and 24<sup>th</sup> of November 2020, please refer to **Appendix E**).
- Printed formal notices were placed at the relevant regional and local authority offices (e.g. at the regional council and City of Windhoek) as well as at the entrance of Farm Sonnleiten as can be seen in **Appendix E**.
- The BID was also distributed on request by I&APs during the scoping process.

### **6.2.1 Consultation/Public Meetings**

The consultant took initiative by consulting all neighbours close to the site. A public meeting was scheduled and there was no attendance because of the nature of location of the project. The consultant took initiative by consulting surrounding farm owners on 2 December 2020 and no objections were raised by these directly affected I&AP in relation to the project. The Manager of the Hosea Kutako Airport was also consulted to provide inputs with regards to the project, and requested the following be done before any blasting activities occur at the proposed site:

- That a focussed meeting is held between the leadership of Eagle Focus Investments, Air Traffic Control and the person(s) appointed to undertake the blasting to perform a detailed risk assessment, particularly with respect to air traffic. This meeting will be scheduled as soon as an ECC has been issued.
- That a blasting permit is obtained from the necessary regulatory authority and;

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- That the area (radius and height extent) of influence of the planned blast is established as part of the blasting designs. Accordingly, no blasting is permitted before this parameter has been established.

The public consultation register and comment forms are attached in **Appendix F**. The details of these engagements are as given in **Table 6-1** below.

**Table 6-1. Details of public consultations held**

<b>Person Consulted</b>	<b>Organization</b>	<b>Their Key Comments/ Input</b>
Maria Hamunyela	Chief Safety Officer: Namibia Airports Company	No objection to the project; Project can proceed
Karl Giel	Farm Owner (neighbouring farm)	No objection to the project; Project can proceed
Andrea Holfrohne	Owner: Farm Sonnleiten	No objection to the project; Project can proceed

### 6.2.2 Public Site Notices

Site notices/posters informing the public and affected land owners about the ES process were placed at the following strategic locations as shown in **Figure 6-1**:

- Entrance to Farm Sonnleiten
- Official notice board at the City of Windhoek's Headquarters offices
- At the Khomas Regional Council notice board
- At the public notice board at Hosea Kutako International Airport



Figure 6-1. Public notices placed at various official notice boards and on site at Farm Sonnleiten No. 78

### **6.3 First Round of Public Consultation Feedback: Issues & Concerns**

The key issues raised during the one-on-one engagements as well as through other communication platforms are summarised in **Table 6-2** below. All comments, concerns, issues, and feedback regarding significant issues received from I&APs (including authorities) have been summarised in **Appendix F** and **Appendix G**, responded to or clarified as part of the impact and issues assessment under Chapter 7 (including feedback that does not raise significant issues).

**Table 6-2. Key issues raised during the one-on-one engagements held**

<b>CATEGORY</b>	<b>ISSUES</b>	<b>RESPONSE OR RECOMMENDED MEASURE</b>
Land Use and Farm Security	Uncontrolled Access	There will be controlled access and notification will be given to nearby farm owners prior to site works
Nuisance	Noise	There will be blast notifications and noise minimization strategies put in place to control this

### **6.4 Second Round of Public Consultation: ESA and EMP Report Review**

The ESA and EMP Reports were submitted onto the MEFT's online portal on 08 January 2021 and an email communication was circulated to all registered I&APs to review and submit comments on the reports directly to the MEFT. A hard copy of the report was also submitted directly to the City of Windhoek's Acting Head of Health Promotion (Mr. Mekondjo Shanyengange) on 05 January 2021. Similar copies were emailed to the directly affected land owner.

The identified impacts and issues raised that are likely to affect the biophysical and social environment of the project site and surrounding area are described and assessed under the following chapter. The mitigation measures are also provided under the respective potential impacts in the same chapter.

## **7 IMPACT IDENTIFICATION AND ASSESSMENT**

The purpose of this section is to identify and assess the most pertinent environmental impacts by describing certain quantifiable aspects of these impacts and to provide possible mitigation measures to minimise the magnitude of the impacts that are likely to arise from the various activities that constitute the proposed small scaled quarrying within MC 72245. These identified potential impacts have been evaluated. Mitigation measures are proposed for the different potential impacts identified. Comments and concerns raised during the public consultation process have been considered and accounted for in the assessment of these potential impacts.

The following potential impacts have been identified:

### **Potential Positive Impacts:**

The proposed project has the potential to employ approximately 10 -15 people on a full-time basis, which could improve livelihoods and make a positive contribution towards unemployment reduction and advancement of unemployed youth of Windhoek through the transfer of certain skills. The skills transfer aspect is likely to arise as the proponent will implement ad-hoc training programme for some of its staff members, particularly on the operation and maintenance of the composite crusher. During the decommissioning/ closure phase, opportunities for casual employment are likely to increase as the number of unskilled positions will likely increase. The project will increase and guarantee the supply of durable construction aggregates for the area of Windhoek, including the international airport and the Finkenstein Township. Other potential positive impacts include: operating levies and surface rental fees payable to local authorities and the landowner; potential revenue collection by the national road agency through fees charged on loaded trucks; and potential new business for the local business such as small transport, cleaning, maintenance, security and canteen businesses through sub-contracting.

### **Potential Negative Impacts per Primary Activity:**

Quarrying:

**Table 7-1. Potential negative impacts per primary activity**

<b>PRIMARY ACTIVITY - SITE SET UP</b>	
<b><u>Activity/ Hazard</u></b>	<b><u>Potential Impact</u></b>
	<ul style="list-style-type: none"> <li>• Potential destruction of natural vegetation</li> <li>• Potential disturbance of natural</li> </ul>

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<p>Land clearance and stripping of topsoils and sub-soils over footprints of surface infrastructure such as the quarry pit, stockpile bays, mobile site office, weigh bridge, temporary abluion facilities and crushing plant</p>	<p>ecosystem for wildlife</p> <ul style="list-style-type: none"> <li>• Potential disturbance and alteration of soil structure due to construction and traffic compaction, resulting in increased runoff coefficients and possible increase in erosion susceptibility</li> <li>• Potential generation of solid waste</li> <li>• Potential generation of dust from earthworks</li> <li>• Potential injuries and fatalities of cattle and wildlife from fall and trips arising from exposed excavations</li> </ul>
<p>Establishment and setting up of quarry site, mobile site office, mobile crusher, weigh bridge and temporary abluion facilities</p>	<ul style="list-style-type: none"> <li>• Potential alteration to land uses from grazing pasture and some hunting to mining. All these current land uses will be restricted or impended within the development footprint.</li> <li>• Establishment of the quarry pit and associated surface infrastructure sites will also change the topography and landscape as the quarry will leave a hole in the ground while the establishment of support infrastructures will require flattening of ground, etc.</li> <li>• The envisaged quarry site is situated at the toe of an existing small tributary. Interception of surface runoff from the tributary is likely to lead to erosion and diversion from natural flow paths, thereby fragmenting the watershed grassland</li> <li>• Potential generation of noise from heavy duty lifting equipment such as cranes</li> <li>• Risk of personnel injuries and fatalities</li> </ul>



	<ul style="list-style-type: none"> <li>• Potential visual impacts at night from lighting at the crusher plant and site mobile office since conditions are normally very dark in these rural areas</li> </ul>
<b>PRIMARY ACTIVITY - QUARRYING</b>	
<p>Production drilling, blasting of rockface and bulk excavation of loosen rock</p>	<ul style="list-style-type: none"> <li>• Removal of quartzite will leave an open hole and possibly exposed steep faces on the northern side of the mountain which may be visible from the B6 tarred road. However at a distance of more than 4 km plus the lower lying terrain at the toe of the mountain slope will likely conceal the quarry and crusher plant.</li> <li>• Introduction of harmful substances such as drilling fluids and blasting powder (explosives) may contaminate surface water during runoff; impact flora through direct ingestion by roots of plants; and through indirect ingestion when animals and humans feed on contaminated plants, animals and water.</li> <li>• Safety risk to aviation, public and personnel from potential fly rocks, loose rocks and ground vibrations</li> <li>• Potential generation of noise and vibrations from blasting, which could become a nuisance to surrounding farmers and cause unintended structural damage to nearby civil structures</li> <li>• Potential generation of dust from blasting and bulk excavations</li> <li>• Potential quarry/ pit slope failures after heavy rains due to reduced</li> </ul>

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	<p>shear strengths in rock mass discontinuities</p> <ul style="list-style-type: none"> <li>• Potential disturbance and damage to unforeseen archaeological or heritage sites during drilling, blasting and excavation activities and movements in the area.</li> <li>• Inadequate deliverable of notice for blasting activities to land owners and the airport may result in conflicts with landowners and the aviation regulator</li> </ul>
<p>Loading and hauling of rock to the crushing plant</p>	<ul style="list-style-type: none"> <li>• Possible collisions between moving plant and personnel and animals</li> <li>• Potential generation of noise as trucks will be moving to and from the plant throughout day hours</li> <li>• Potential generation of dust from loading/ offloading of rock on to trucks and into primary crusher, and from haul roads. Dust may impair visibility</li> <li>• Possible soil/ fuel spills from trucks if breakdowns occur and unexpected hydraulic pipe bursts occur</li> <li>• Linear infrastructures such as haul roads may impair migration of certain fauna due to reducing the chance of an animal surviving its migration due to possible collisions with vehicles and moving plant</li> <li>• Potential accidents arising from poor haul road conditions</li> </ul>
<p>Movement of personnel, machinery, cattle and wildlife near the edge of the quarry</p>	<ul style="list-style-type: none"> <li>• Potential injuries and fatalities as well as damage to plant</li> </ul>
<p>Decommissioning/ closure of the quarry</p>	<ul style="list-style-type: none"> <li>• Decommissioning of the quarry</li> </ul>

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operations	operation will result in the lay-off of employees, reducing formal employment opportunities and income levels
<b>PRIMARY ACTIVITY - CRUSHING</b>	
Discharge of loose rock into primary crusher	<ul style="list-style-type: none"> <li>• Potential generation of dust and noise</li> </ul>
Possible abstraction of groundwater for domestic and production use	<ul style="list-style-type: none"> <li>• Potential reduction in groundwater levels overtime due to drawdown</li> </ul>
Operation of the crusher	<ul style="list-style-type: none"> <li>• Potential generation of excessive dust especially if the primary and tertiary crusher feeds have too much fines. This may result in contraction of respiratory diseases, and cause equipment and personnel/ animal collisions due to impaired visibility</li> <li>• Potential generation of noise during the day as the crusher will run for about 14 to 15 hours daily</li> <li>• Potential injury of personnel during maintenance work on the crushers and screens due to “no lockout” practice</li> <li>• Potential for compromised security to affected and nearby farms as general workers now have access to these private lands</li> <li>• Unauthorized access and entry to crusher plant area</li> <li>• Miscommunications and lack of honoring terms and conditions of the surface lease agreement may lead to tensions between the project owners and the land owners</li> <li>• Possible daily pumping of groundwater to cool drilling and</li> </ul>

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	crusher equipment
<b>PRIMARY ACTIVITY - STOCKPILING</b>	
Material stockpiling before and after crushing	<ul style="list-style-type: none"> <li>• Potential generation of excessive dust and consequent impairment of visibility</li> <li>• Potential theft of stockpiled materials through unauthorized access to stockpile bays</li> <li>• Potential collisions between plant and personnel/ animals</li> </ul>
<b>PRIMARY ACTIVITY - CROSS ACTIVITIES</b>	
Illegal hunting and fire wood gathering during operating hours of the quarry and crusher plant	<ul style="list-style-type: none"> <li>• Potential increased pressure on local fauna and flora due to illegal hunting and fire wood gathering, respectively</li> </ul>
Community from Windhoek to Site	<ul style="list-style-type: none"> <li>• Daily in-migration of general workers from Windhoek will expose such personnel to potential road accidents and contribute adversely to traffic congestion between Windhoek and the international airport</li> </ul>
Workers being on site	<ul style="list-style-type: none"> <li>• Possible littering and solid waste pollution in and around working areas</li> <li>• Possible human waste</li> </ul>
Storage of old unused equipment/ tyres/ oil drums on site	<ul style="list-style-type: none"> <li>• Potential adverse visual impacts, as well as soil and water pollution from hydrocarbon spills</li> </ul>
Active workers and plant on site	<ul style="list-style-type: none"> <li>• Possible nuisance on land owners and neighbours due to noise and dust</li> </ul>

It is evident from the table above that the majority of impacts are safety (for both personnel and animals) and pollution related, and can therefore be managed through measures outlined in the accompanying EMP.

### 7.1.1 Impact Assessment Screening

The potential impacts identified by Omavi Consultants based on professional experience as well as through consultations with Interested and Affected Parties (I&APs) were screened according to a set of questions (presented in **Figure 7-1**). This resulted in highlighting the key impacts requiring further detailed assessment of each impact in the respective sections of this chapter.

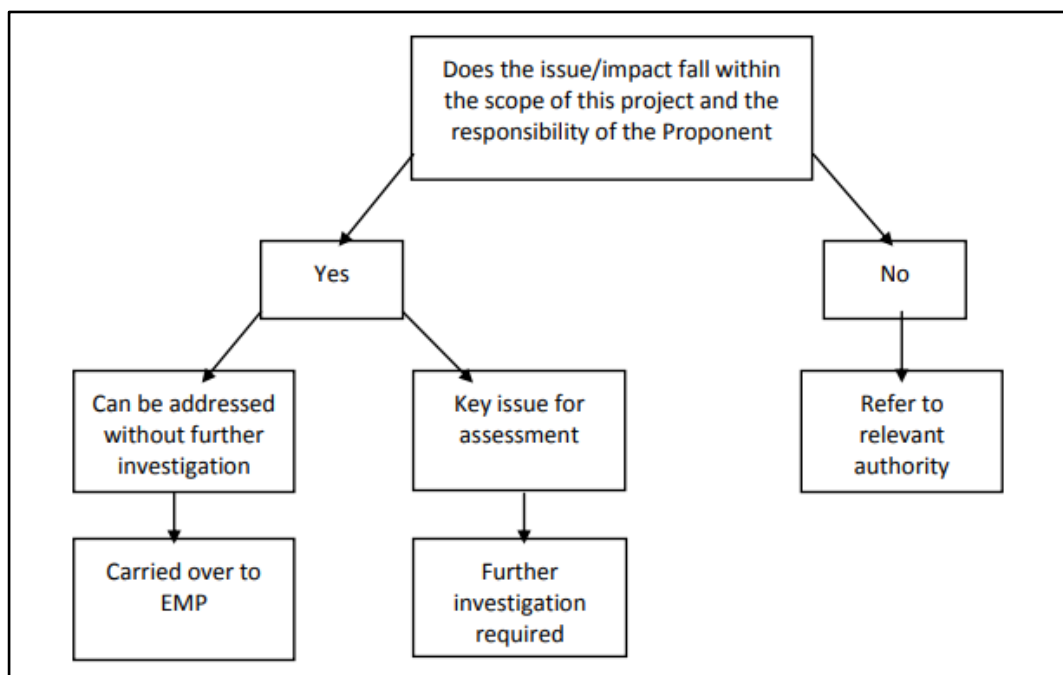


Figure 7-1. Screening process for determining key impacts

## 7.2 Impact Assessment Methodology

The methodology used to assess and determine the significance of the impacts listed in Table 9 is explained below. The impact prediction and evaluation stage is a key component of the EIA process because it brings together project characteristics with the baseline environmental characteristics. Impact prediction and evaluation involve envisaging the possible changes to the environment as a result of the project. The methodology was applied to determine the magnitude of impact and whether or not the impact was considered significant and need further investigation. The assessment methodology considered all stages of the project's life cycle that is scoped into the assessment and is presented in this report. **Table 7-2** below summarises the impact assessment criteria adopted in this report.

Table 7-2. Assessment methodology for evaluating potential impacts

<b>Risk Event</b>	Description of the hazard that may lead to an impact.
<b>Status (+ or -)</b>	<b>Positive</b> - environment overall will benefit from the impact <b>Negative</b> - environment overall will be adversely affected by the impact <b>Neutral</b> - environment overall will not be affected
<b>Extent</b>	<b>Site specific:</b> <b>Local</b> - limited to within 15 km of the area <b>Regional</b> - limited to ~100 km radius <b>National</b> - limited to within the borders of Namibia <b>International</b> - extending beyond Namibia's borders
<b>Duration</b>	<b>Very Short</b> (days, <3 days) <b>Short</b> (days, 3 days – 1 month) <b>Medium</b> (months, 1 - 5 years) <b>Long</b> (years, 5 - 20 years) <b>Permanent</b> (>20 years)
<b>Intensity</b>	<b>No lasting effect</b> - No environmental functions and processes are affected <b>Minor effects</b> - The environment functions, but in a modified manner <b>Moderate effects</b> - Environmental functions and processes are altered to such extent that they temporarily cease <b>Serious effects</b> - where environmental functions and processes are altered such that they permanently cease and/or exceed legal standards/requirements
<b>Probability</b>	Refers to the probability that a specific impact will happen following a hazard event. <b>Improbable</b> - low likelihood <b>Probable</b> - distinct possibility (50% probability) <b>Highly probable</b> - most likely <b>Definite</b> - impact will occur regardless of prevention measures
<b>Prevention</b>	Measures to reduce the probability of an impact occurring.
<b>Significance (no mitigation)</b>	<b>None</b> - A concern or potential impact that, upon evaluation, is found to have no significant impact at all. <b>Low</b> - Any magnitude, impacts will be localised and temporary. Accordingly, the impact is not expected to require amendment to the project design. <b>Medium</b> - Impacts of moderate magnitude locally to regionally in the short term. Accordingly, the impact is expected to require modification of the project design or alternative mitigation. <b>High</b> - Impacts of high magnitude locally and in the long term and/or regionally and beyond. Accordingly the impact could have a 'no go' implication for the project unless mitigation or re-design is practically achievable
<b>Mitigation</b>	Description of possible mitigation measures

<p><b>Significance (with mitigation)</b></p>	<p><b>None</b> - A concern or potential impact that, upon evaluation, is found to have no significant impact at all.</p> <p><b>Low</b> - Any magnitude, impacts will be localised and temporary. Accordingly, the impact is not expected to require amendment to the project design.</p> <p><b>Medium</b> - Impacts of moderate magnitude locally to regionally in the short term. Accordingly, the impact is expected to require modification of the project design or alternative mitigation.</p> <p><b>High</b> - Impacts of high magnitude locally and in the long term and/or regionally and beyond. Accordingly the impact could have a 'no go' implication for the project unless mitigation or re-design is practically achievable.</p>
<p><b>Confidence Level</b></p>	<p>The degree of confidence in the predictions, based on the availability of data/ information and specialist knowledge.</p> <p><b>Low</b> - would indicate that further investigation is required if the impact could potentially be significant</p> <p><b>Medium</b> - further investigation may be required if the impact could be significant</p> <p><b>High</b> - based on the site specific specialist knowledge and information. The impact is well understood. However monitoring may be required to determine the effectiveness of possible mitigation measures</p>

### 7.3 Impact Assessment

A complete assessment of the potential impacts identified is presented in **Table 7-3** below.

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Table 7-3. Assessment of identified impacts

IMPACTS ON SOIL DEGRADATION AND EROSION	
<b>Description of Potential Impact</b>	Soil degradation will result from soil disturbance caused by heavy machinery and trucks; stripping of topsoil and sub-soils; soil compaction by traffic; loss of original soil depth and volume; degradation of stockpiled topsoil due to erosion; and contamination of soils by drilling fluid residues and hydrocarbon spills  Soil erosion will result from loosening of soil as a result of earthworks, removal of vegetation and increased surface runoff due to surface compaction
<b>Nature</b>	Negative
<b>Extent</b>	<b>Site Specific</b> and <b>Local</b>
<b>Duration</b>	<b>Long term</b> – the structure and depths of soils will be altered for a long time
<b>Intensity</b>	<b>High</b>
<b>Probability</b>	<b>Highly Probable</b> – as removal of vegetation and topsoil is inevitable
<b>Prevention</b>	Complete prevention of this impact will not be possible
<b>Significance (no mitigation)</b>	<b>Medium</b> – due to the localized extent of the project



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<p><b>Mitigation</b></p>	<ul style="list-style-type: none"> <li>• Minimize the project footprint and therefore disturbance to a minimal area as much as possible</li> <li>• Minimize soil contamination through containment and handling of potentially polluting materials</li> <li>• Implement soil conservation measures (e.g. segregation, proper placement and stockpiling of clean soils and overburden material for existing site remediation and maintaining soil fertility or topsoils stored for future rehabilitation)</li> <li>• Ensure that the overall thickness of soils utilized for rehabilitation is consistent with surrounding undisturbed areas and future land use</li> <li>• Design quarry and haul road slopes to an appropriate gradient for rehabilitation</li> <li>• Implement regular soil quality testing, especially from sites downstream of the quarry and other working areas</li> <li>• Design haul roads with appropriate drainage channels along the road to avoid erosion</li> <li>• Schedule construction works to avoid heavy rainfall periods to the extent practical</li> <li>• Minimize length and steepness of slopes</li> <li>• Re-vegetate areas promptly to the extent possible</li> <li>• Design channels and ditches for post construction flows</li> <li>• Line steep channels and slopes, or place rip rap in such channels</li> <li>• Identify and stabilise areas that are highly susceptible to erosion</li> </ul>
<p><b>Significance (with mitigation)</b></p>	<p><b>Low</b> – provided slopes are made safe and no excess compaction</p>
<p><b>Confidence Level</b></p>	<p><b>Moderate</b></p>
<p><b>IMPACTS ON CHANGES IN LAND USE</b></p>	
<p><b>Description of Potential Impact</b></p>	<p>The proposed project area is currently used for cattle and wildlife farming. The project infrastructures (e.g. the quarry, crusher plant, weigh bridge, stockpile bays, haul roads, site office) will require clearing, ground levelling and excavation, topsoil stripping and development of stockpiles. These activities will prohibit current farming activities within the project area. Hence, agricultural land use will give way to use for mining at the affected sites</p>
<p><b>Nature</b></p>	<p>Negative</p>

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<b>Extent</b>	<b>Site Specific to Local</b>
<b>Duration</b>	<b>Long term</b> because the quarry site cannot be reclaimed to its original state and sites earmarked for other infrastructure will take long to recover to their natural state
<b>Intensity</b>	<b>High</b>
<b>Probability</b>	<b>Definite</b>
<b>Prevention</b>	Complete prevention of this impact will not be possible, but the extent of the impact can be minimized by ensuring that changes in land use are confined to the footprints of the proposed structures
<b>Significance (no mitigation)</b>	<b>Medium</b> – due to the localized extent
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>• Minimize the project footprint and therefore disturbance to a minimal area as much as possible</li> <li>• Restrict access to sensitive soil areas</li> <li>• Avoid mixing topsoil (which typically rich in seeds) with subsoils during storing of topsoil. Topsoil will have to be removed and safely stockpiled in a particular area and demarcated for later use in rehabilitation work</li> </ul>
<b>Significance (with mitigation)</b>	<b>Low</b>
<b>Confidence Level</b>	<b>High</b>
<b>IMPACTS ON TOPOGRAPHY AND LANDSCAPE</b>	
<b>Description of Potential Impact</b>	Changes in landscape topography will result from creation of a quarry in bedrock, removal of overburden coupled with levelling of ground for the crusher and support infrastructures
<b>Nature</b>	Negative

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<b>Extent</b>	<b>Site Specific to Local</b>
<b>Duration</b>	<b>Permanent</b>
<b>Intensity</b>	<b>High</b>
<b>Probability</b>	<b>Definite</b>
<b>Prevention</b>	Complete prevention of this impact will not be possible unless the no go option is implemented
<b>Significance (no mitigation)</b>	<b>Medium</b>
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>• Practice ongoing partial rehabilitation by replacing soil on cut platforms / access ramps</li> <li>• Practice rockface blinding by placing natural waste rock material against exposed slopes and quarry ramp face</li> </ul>
<b>Significance (with mitigation)</b>	<b>Low</b> – as the impact will be localized
<b>Confidence Level</b>	<b>High</b> – the detailed mine/ quarry plan will facilitate more detailed management recommendations
<b>IMPACTS ON VEGETATION</b>	
<b>Description of Potential Impact</b>	Destruction of habitats through site clearing over footprints of the proposed quarry, weigh bridge, crusher, stockpile bays and mobile container office
<b>Nature</b>	Negative

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<b>Extent</b>	<b>Site Specific to Local</b>
<b>Duration</b>	<b>Long term</b> because even if the current planned life of quarry is only 5 years, cleared vegetation is unlikely to recover completely within the next 20 years, especially at the quarry site
<b>Intensity</b>	<b>High</b> as vegetation over the footprints of these structures will be removed completely. Intensity is lower for animals
<b>Probability</b>	<b>Definite</b>
<b>Prevention</b>	Complete prevention of this impact will not be possible
<b>Significance (no mitigation)</b>	<b>High</b>
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>• Avoid illegal wood gathering by enforcing harsh measures to workers for non-compliance</li> <li>• Rescue any geophytes, and donate them to nurseries</li> <li>• Establish a nursery on site if necessary and if budget permits</li> <li>• Make minor adjustments to proposed haul roads between the quarry, crusher and stockpile bays to avoid areas of thick and/ or sensitive vegetation</li> <li>• Plant tall trees around the crusher area to reduce amount of dust reaching indigenous flora</li> </ul>
<b>Significance (with mitigation)</b>	<b>Medium</b>
<b>Confidence Level</b>	<b>High</b>
<b>IMPACTS FROM SOLID WASTE</b>	
<b>Description of Potential Impact</b>	Solid waste will be generated in and close to working areas (e.g. quarry and crusher area); in areas where maintenance of machinery will be carried out; in sites where used parts, used oil and scrap metal will be stored; and from offices (e.g. packaging, paper, kitchen waste).
<b>Nature</b>	Negative

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<b>Extent</b>	Site Specific
<b>Duration</b>	Medium term as per the current mine plan of 5 years
<b>Intensity</b>	Low
<b>Probability</b>	Probable
<b>Prevention</b>	<ul style="list-style-type: none"> <li>Prevention can be achieved if littering is forbidden and site staff are disciplined for non-compliance</li> </ul>
<b>Significance (no mitigation)</b>	Medium
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>Combustible material can probably be used in the kilns</li> <li>removal of general waste to an approved landfill</li> <li>Recycling or disposal to Windhoek's hazardous waste site</li> <li>All hazardous waste must be sent to Windhoek for recycling or disposal at the city's hazardous waste disposal site, Kupferberg</li> <li>The only waste water will be domestic sewage and water used for washing equipment, which should be treated and re-used e.g. for dust suppression</li> </ul>
<b>Significance (with mitigation)</b>	Low
<b>Confidence Level</b>	High
<b>IMPACTS ON INDIGENEOUS FAUNA (REPTILES, MAMMALS, BIRDS)</b>	
<b>Description of Potential Impact</b>	Displacement from the footprint of the sites, potential fatalities due to contaminated surface water, road kills or other hazards / litter. Restriction of movement and migration due to increased movement of vehicles/ plant and increased noise levels. Potential loss of habitats for feeding and possibly breeding sites for birds
<b>Nature</b>	Negative

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<b>Extent</b>	The footprint of the site, access roads and immediate surrounds
<b>Duration</b>	<b>Medium to long term</b> – Impacts will persist over the lifespan of the project, which at the moment is capped to 5 years. However, impacts associated with some of the sites such as the quarry are likely to persist long after end of mining
<b>Intensity</b>	<b>Low</b> as most animals will easily migrate away from the affected sites
<b>Probability</b>	<b>Highly Probable</b>
<b>Prevention</b>	Complete prevention of this impact will not be possible
<b>Significance (no mitigation)</b>	<b>Medium</b>
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>• Prevent animal access to artificial water bodies through fencing</li> <li>• Speed limits and traffic control measures to minimise the risk of road kills</li> <li>• Prevent illegal hunting and trapping by enforcing harsh non-compliance measures to workers</li> <li>• Prevent creation of hazards by means of good “housekeeping” and prevention of litter</li> <li>• Any animal fatalities should be recorded and the causes established and remedied</li> <li>• Avoid disturbance of vulture nests (if any) during the breeding season</li> <li>• Avoid activities close to large trees near the base of the mountains</li> </ul>
<b>Significance (with mitigation)</b>	<b>Low</b>
<b>Confidence Level</b>	<b>High</b>
<b>DUST IMPACT ON AIR QUALITY</b>	
<b>Description of Potential Impact</b>	Generation of excessive dust resulting from site preparation earthworks, quarrying activities (production drilling, blasting, bulk excavation), hauling trucks, crushing and stockpiling of crushed rock. The generated dust will reduce visibility across the site and adversely impact on the respiratory well-being of personnel working in close proximity to the source areas. Additionally, photo-transpiration efficiency of the surrounding plants may be hampered. The

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	dusty plants are less palatable to grazing or browsing animals, and therefore availability of edible pasture for animals may be diminished.
<b>Nature</b>	Negative
<b>Extent</b>	<b>Site Specific</b> and possibly <b>local</b> depending on the mobility of particles and prevailing weather (wind speed, wind direction, precipitation, etc) conditions. Typically dust from quarrying and crushing activities affects areas within 2 – 3 km of the source, beyond which air quality conditions normalize. For dust generated from site preparation earthworks, quarrying activities (production drilling, blasting, bulk excavation), crushing and stockpiling only on very windy days will dust travel further than 15km because the source is generally fixed and is a single vector to the affected site and will not move unlike with trucks on dirt roads.
<b>Duration</b>	<b>Medium term</b> as the dust generating activities will be ongoing throughout the life of the quarry, which at the moment is capped to 5 years subject to market performance. Flora whose functioning will be adversely affected by dust cover are those directly downwind.
<b>Intensity</b>	<b>Moderate effect</b> as air quality conditions will be altered temporarily for the period of these dust generating activities
<b>Probability</b>	<b>Highly Probable</b>
<b>Prevention</b>	<ul style="list-style-type: none"> <li>• Prevention of dust generation for the proposed activities is inevitable</li> </ul>
<b>Significance (no mitigation)</b>	<b>High</b> The small scale quarrying and crushing activities will adversely change the ambient conditions that often prevail. Hauling trucks will create dust plumes trailing behind them, but this will be limited by speed restrictions. The impact is persistent for the medium term (i.e. up to 5 years).
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>• Stockpile soils and aggregates with vegetation in/on it</li> <li>• Avoid clearing vegetation unnecessarily or too far in advance of quarrying</li> <li>• Spraying haul roads occasionally with recycled water</li> <li>• Dust filters on crusher, and enclosed conveyor system</li> <li>• Enforce speed limits of 30 km/ hour on site</li> <li>• Stop blasting and bulk excavation on very windy days</li> </ul>

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	<ul style="list-style-type: none"> <li>• Train personnel to wear personal protection equipment at all times</li> <li>• Test personnel health at regular intervals and implement dust monitoring from the start of production</li> <li>• Install dust collection buckets 500m, 1km and 2km down-wind of the quarry and crusher site to monitor dust levels through time and to help evaluate how the dust concentrations vary with distance from the quarry and crusher</li> </ul>
<b>Significance (with mitigation)</b>	<b>Medium</b>
<b>Confidence Level</b>	<b>High</b> <ul style="list-style-type: none"> <li>• Dust monitoring program must be implemented right from the start of production to establish dust levels</li> </ul>
<b>NOISE AND VIBRATIONS IMPACTS FROM QUARRYING</b>	
<b>Description of Potential Impact</b>	Noise and ground vibrations will be generated from production drilling and blasting. The nuisance factor of these noise sources will depend on the proximity of the quarry to the national road, farm houses and sensitive animal habitats. The proposed quarry activities will potentially contribute to the cumulative effects of traffic noise in areas within 2 – 3 km from the quarry site. Hence the farm house located about 2.9 km northwest of the proposed quarry site will be adversely affected. The noise may also impact on the temporary or permanent habits of the fauna in that particular location where activities takes place.
<b>Nature (-/+)</b>	<b>Negative</b>
<b>Extent</b>	<b>Site specific</b> and <b>Localized</b> (up to 3km) – for blasting
<b>Duration</b>	<ul style="list-style-type: none"> <li>• Blasting – once per day (during day time)</li> <li>• Crusher and vehicles in the quarry – 14 to 16 hours/day x 6 days/week</li> <li>• Medium term (up to 5 years as per the current mine plan)</li> </ul>
<b>Intensity</b>	<ul style="list-style-type: none"> <li>• At 3km from the site, the impact should be low.</li> </ul>
<b>Probability</b>	<b>Probable</b> – depending on distance from the source



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<b>Prevention</b>	Noise creation cannot be prevented completely and will occur and should be mitigated as best as possible.
<b>Significance (no mitigation)</b>	<b>Low</b> - although fairly intense nearby, it will be of very short duration each day
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>- Regular maintenance of drilling machinery should maintain the acceptable noise levels for operators working with the machines. The activities are to take place during daylight hours only. Periods of silence during the day may be necessary.</li> <li>- Maintain silencers on equipment and vehicles</li> <li>- Leave as much vegetation in the surrounding as possible</li> <li>- Warn nearby farmers of blasting as well as the control room for the international airport</li> <li>- Any complaints regarding noise should be recorded.</li> </ul>
<b>Significance (with mitigation)</b>	<b>Low</b>
<b>Confidence Level</b>	<b>High</b>
<b>NOISE AND VIBRATIONS IMPACTS FROM CRUSHER AND MOVING VEHICLES/ PLANT</b>	
<b>Description of Potential Impact</b>	Noise and ground vibrations will be generated from the crusher plant (especially the primary crushers) and moving vehicles/ plant on site. This also includes noise exposure of operators from earthmoving machines
<b>Nature (-/+)</b>	<b>Negative</b>
<b>Extent</b>	<b>Site specific</b> – if designs meet SABS standards at 3 km from plant
<b>Duration</b>	<ul style="list-style-type: none"> <li>• Crusher and moving machinery/ plant/ vehicles at the crusher and stockpile bays – 14 to 16 hours/day x 6 days/week</li> </ul>
<b>Intensity</b>	<ul style="list-style-type: none"> <li>• Low at a few hundred meters away</li> </ul>

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<b>Probability</b>	<b>Probable</b> – depending on distance from the source
<b>Prevention</b>	Noise creation cannot be prevented completely and will occur and should be mitigated as best as possible.
<b>Significance (no mitigation)</b>	Medium
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>– Design to meet OHS standards and key noise generating components to be fitted with noise proof canopies. Must meet SABS and OHS standards at 3 km</li> <li>– Regular maintenance of drilling machinery should maintain the acceptable noise levels for operators working with the machines. The activities are to take place during daylight hours only. Periods of silence during the day may be necessary.</li> <li>– Maintain exhaust and silencers on equipment and vehicles</li> <li>– Leave as much vegetation in the surrounding as much as possible.</li> <li>– Limit traffic speed to 30 km</li> <li>– Any complaints regarding noise should be recorded.</li> <li>– Controlled blasting with proper spacing, burden and optimum charge/ delay to be maintained</li> <li>– Install portable noise monitoring devices at the crusher site as well as in all working areas (weigh bridge, stockpile bags, next to haul roads) and calibrate all equipment by fitting noise suppressors to ensure compliance to acceptable noise levels. The noise monitors should be installed at least 1.2m above ground and at least 4m away from any surface. In procuring the noise monitoring devices the proponent must ensure that their specifications comply with SANS 10103:2008, ISO 9613-2:1996 (Acoustics – description, measurement and assessment of environmental noise) and ISO 6395:2008 (Earth Moving Machinery – Determination of sound power level – Dynamic test conditions). The acceptable noise levels according to SANS 10103:2008 are summarized below for guidance:</li> </ul>

	Type of District	Equivalent Continuous Rating Level ( $L_{Req,T}$ ) for Noise (dBA)					
		Outdoors			Indoors, with Open Windows		
		Day-night $L_{R,dn}^{1)}$	Day-time $L_{Req,d}^{2)}$	Night-time $L_{Req,n}^{2)}$	Day-night $L_{R,dn}^{1)}$	Day-time $L_{Req,d}^{2)}$	Night-time $L_{Req,n}^{2)}$
a) Rural districts	45	45	35	35	35	25	
b) Suburban districts with little road traffic	50	50	40	40	40	30	
c) Urban districts	55	55	45	45	45	35	
d) Urban districts with one or more of the following: workshops; business premises; and main roads	60	60	50	50	50	40	
e) Central business districts	65	65	55	55	55	45	
f) Industrial districts	70	70	60	60	60	50	
<p>Note: Daytime: 06:00 to 22:00, Night-time: 22:00 to 06:00.</p> <p><sup>1)</sup> Equivalent continuous rating levels that include corrections for tonal character and impulsiveness of the noise and the time of day.</p> <p><sup>2)</sup> Equivalent continuous rating levels that include corrections for tonal character and impulsiveness of the noise.</p>							
Significance (with mitigation)	Low						
Confidence Level	High						

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IMPACTS ON SURFACE WATER RESOURCES	
<b>Description of Potential Impact</b>	Potential contamination of surface water will result from: reduced quality of runoff and seepage from the quarry, stockpile areas and waste rock dumps; accidental effluent discharge; Accidental discharge of grease, oil, fuel and other hydrocarbon from storage facilities; erosion resulting in mobilisation of soils into streams and rivers from exposed road surfaces and other cleared areas
<b>Nature (+ or -)</b>	<b>Negative</b>
<b>Extent</b>	<b>Local</b>
<b>Duration</b>	<b>Medium Term</b> – as per the current life of quarry of 5 years. Contaminants may however stay in the water stream for a long time
<b>Intensity</b>	Generally <b>Low</b> , except during heavy rains
<b>Probability</b>	<b>Highly Probable</b> – as the proposed project site generally lies on a gentle slope
<b>Prevention</b>	Complete prevention of these impacts is not possible
<b>Significance (no mitigation)</b>	<b>Medium</b>
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>• Establish water controls</li> <li>• Design, construct and maintain temporary drainage installations for reoccurrence periods stipulated under the Roads Authority Drainage Manual</li> <li>• Keep clean water away from quarry and crusher sites through the use of diversion channels</li> <li>• Keep dirty water contained so that it cannot be discharged to the environment but reused within the plant</li> <li>• Apply erosion controls to minimize sediment runoff</li> <li>• Ensure that the borehole to be used for domestic purposes is NOT located downstream of the quarry</li> <li>• Install at least one (1) water quality monitoring borehole downstream of the quarry</li> </ul>
<b>Significance (mitigation)</b>	<b>Low</b>

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<b>Confidence Level</b>	<b>High</b>
<b>IMPACTS ON GROUNDWATER</b>	
<b>Description of Potential Impact</b>	Potential contamination of groundwater by residues of explosives, residues of drilling fluids, fuels and oils from vehicles and machinery used in the quarry and close to the crusher, hydraulic fluids or domestic sewage. Other potential sources of groundwater contamination may include wash water from vehicles and crusher equipment
<b>Nature (+ or -)</b>	<b>Negative</b>
<b>Extent</b>	Since water will be abstracted from a single borehole and probably the quarry, the cone of depression should be sufficient to limit any contamination to an area close to the site.
<b>Duration</b>	The potential for contamination will exist for as long as the operations continue
<b>Intensity</b>	<b>Low to Minor</b>
<b>Probability</b>	<b>Highly probable</b> – unless mitigation is effectively implemented
<b>Prevention</b>	<ul style="list-style-type: none"> <li>• Prevention of the impacts is possible to a certain degree if for instance vehicles are properly maintained and all parking lots are paved with peripheral diversion ditches to divert any contact water</li> </ul>
<b>Significance (no mitigation)</b>	<b>Medium</b>
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>• Pump water from quarry pit for use</li> <li>• Maintain all vehicles to prevent spills of oils, hydraulic fluids etc</li> <li>• Re-use treated sewage water</li> <li>• Pave vehicle parks and collect runoff</li> <li>• Bund all hazardous liquid storage installations such as the trailer mounted diesel tank</li> <li>• Ensure collection of liquid waste and recycling or legal disposal at an approved disposal facility</li> <li>• Water quality tests should be undertaken to establish baseline water quality, and periodic water quality monitoring from abstraction boreholes is recommended during operations.</li> <li>• Any waste water (effluent) to be discharged into the environment would require an Article 21 Permit and</li> </ul>

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must comply with the following standards:

**TABLE 5 GENERAL STANDARDS FOR ARTICLE 21 PERMITS (EFFLUENTS)**

Determinants	Maximum allowable levels
pH	5,5% – 9,5%
Dissolved oxygen	A saturation of at least 75%
Typical faecal coli counted/100ml	No typical coli should be counted
Temperature	35 C
Chemical oxygen demand	75 mg/l
Oxygen absorbed	10 mg/l
Biological oxygen demand	no value given
Total dissolved solids	Not more than 500 mg/l than the TDS' of the inlet water
Total suspended solids	25 mg/l
Sodium	Not more than 90 mg/l
Sodium concentration of the inlet water	
Fats, oil and grease	2,5 mg/l (lgravimetric method)
Chlorine, residual	0,1 mg/l as Cl
Free and saline ammonia	10 mg/l as N
Arsenic	0,5 mg/l as As
Boron	1,0 mg/l as B
Chromium, hexavalent	0,05 mg/l as Cr (VI)
Chromium, total	0,5 mg/l as Cr
Copper	1,0 mg/l as Cu
Lead	1,0 mg/l as Pb
Sulphide	1,0 mg/l as S
Fluorine	1,0 mg/l as F
Zinc	5,0 mg/l as Zn
Phenolic compounds	0,1 mg/l as phenol
Cyanide and related compounds	0,5 mg/l as CN

Significance (mitigation)

Low

Confidence Level

High

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<b>OCCUPATIONAL HEALTH AND SAFETY IMPACTS</b>	
<b>Description of Potential Impact</b>	The potential impacts on human safety resulting from project activities could include occupational accidents and injuries, vehicle accidents, exposure to weather extremes, trips and fall on uneven terrain, adverse health effects from dust generation and emissions, and contact with hazardous materials. The potential for these impacts to occur would be low because of the limited number of workers and moving machinery required during exploration and quarrying.
<b>Nature (+ or -)</b>	<b>Negative</b>
<b>Extent</b>	<b>Site specific</b>
<b>Duration</b>	<b>Permanent</b>
<b>Intensity</b>	<b>Minor to Serious Effects</b>
<b>Probability</b>	<b>Highly probable</b>
<b>Prevention</b>	<p>An integrated health and safety management system acts as a monitoring tool and mitigating tool. Typical mitigating measures within the health and safety management systems are: -</p> <ul style="list-style-type: none"> <li>✓ Operational and procedural manuals</li> <li>✓ Health and safety training</li> <li>✓ Housekeeping rules</li> <li>✓ Colour coding areas, pipes, equipment and substances</li> <li>✓ Signage for personal protective equipment (e.g. protective clothing like safety boots and hard hats)</li> <li>✓ Safe working procedures and permits to work</li> <li>✓ Emergency response plans</li> <li>✓ Material Safety Data Sheets (MSDS)</li> <li>✓ First aid treatment and training to employees on site</li> <li>✓ Medical procedures and emergency services</li> <li>✓ Daily safety reminders and/or drills</li> <li>✓ Regulations for handling fuel</li> </ul>

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	The MSDS gives health related medical responses for personnel assisting staff who are exposed to the fuels.
<b>Significance (no mitigation)</b>	<b>Medium</b>
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>• Procedures for dealing with injuries or accidents must be in place and all contact details for emergency personnel available. The company safety manual must be applied as developed by the guidelines and statutory requirements under the Labour Act.</li> <li>• As per the Labour Act (Act 6 of 1992) and SABS 10083 (2004) workers will need to be protected against dust and noise in the work place. SABS 10083 (2004) requires that noise levels in the work place (as defined and measured in accordance with that standard) should not exceed 85 dBA. If this limit is reached, then a noise zone must be declared. A noise zone has special requirements for protective equipment and for training of exposed personnel.</li> <li>• Dust will be released into the air at the quarry, crusher, stockpile bays and haul roads. SABS 1929 (2005) provides the following standards for PM10 particulate matter:             <ul style="list-style-type: none"> <li>- The daily limit for the protection of human health over a 24hour period is 75 µg/m<sup>3</sup></li> <li>- The annual limit for a calendar year is 40 µg/m<sup>3</sup></li> <li>- Workers must go for regular (bi-annual) health check-ups to ensure that these targets are met. In addition, continuous dust monitoring must be implemented</li> <li>- Borehole abstracted for human consumption must comply with acceptable water quality specifications provided in Section 21 of the Water Act (Act 54 of 1956) of the Republic of Namibia</li> </ul> </li> </ul>
<b>Significance (with mitigation)</b>	<b>Low</b>
<b>Confidence Level</b>	<b>High</b>
<b>POTENTIAL SECURITY ISSUES</b>	
<b>Description of Potential</b>	Potential increase in livestock theft and illegal wildlife hunting due to more people and vehicles in the area



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<b>Impact</b>	
<b>Nature (+ or -)</b>	<b>Negative</b>
<b>Extent</b>	<b>Local</b> (Project Farm and neighbouring farms)
<b>Duration</b>	<b>Medium Term</b> – i.e. for as long the operation is ongoing
<b>Intensity</b>	<b>Low</b>
<b>Probability</b>	<b>Improbable</b>
<b>Prevention</b>	Prevention is possible if stringent security and non-compliance measures/ actions are enforced
<b>Significance (no mitigation)</b>	<b>Low</b>
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>• Establish security checkpoints and control points</li> <li>• Conditions of employment</li> <li>• Enforce stringent measures/ actions for non-compliance</li> </ul>
<b>Significance (with mitigation)</b>	<b>Low</b>
<b>Confidence Level</b>	<b>Medium</b> - depends on the effectiveness of security management
<b>VISUAL IMPACTS AND LIGHTING</b>	
<b>Description of Potential Impact</b>	Visual impacts are likely to arise from changes to the aesthetic appeal of the area due to presence of people, vehicles and machinery. Visible changes to habitats due to human activities and the quarry hole.  Lighting at night could be visible from the B6 road
<b>Nature (-/+)</b>	<b>Negative</b>
<b>Extent</b>	<b>Localized</b>
<b>Duration</b>	<b>Short</b> (presence of vehicles, personnel and machinery) <b>Long</b> (un-rehabilitated site)

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<b>Intensity</b>	<b>Moderate Effects</b>
<b>Probability</b>	<b>Definite</b>
<b>Prevention</b>	<ul style="list-style-type: none"> <li>Prevention is not possible for the quarry, crusher and stockpile bay sites.</li> </ul>
<b>Significance (no mitigation)</b>	<b>Medium</b>
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>Minimize the footprint of personnel, vehicles and machinery. As far as is possible no vegetation is to be removed. Where new roads are constructed, the methods should be low intensive and possibly use manpower and not machines.</li> <li>Quarries should be levelled or possibly turned into earth dams which gently sloped sides once mining activities cease so as to restore the visual sense of place of the area to its natural state.</li> <li>The remains of all structures that may have been erected at the quarry and crusher plant shall be demolished and removed on completion of the project.</li> <li>Care must be taken to ensure that all rehabilitated areas are similar to the immediate environment in terms of visual character, vegetation cover and topography and any negative visual impacts will be rectified to the satisfaction of the MEFT officials.</li> <li>Overburden topsoil will be placed back into excavation as part of the rehabilitation programme</li> <li>A distance of more than 4 km plus the lower lying terrain at the toe of the mountain slope will likely conceal the quarry and crusher plant</li> </ul>
<b>Significance (with mitigation)</b>	<b>Low</b>
<b>Confidence Level</b>	<b>Medium</b> - often, both plants and animals will in time recolonize the sites that are disturbed and rehabilitated at least from an aesthetic perspective. The aim is to minimize the footprint to achieve the least impact due to anthropogenic influences.
<b>IMPACTS OF BLASTING</b>	

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<b>Description of Potential Impact</b>	Large amounts of explosives are used in crushed stone operations to produce appropriate-sized rubble. Such amounts of explosives can adversely impact groundwater quality. . Blasting produces noise, which increases with the amount of explosives used and proximity to the blast. Blasting releases enormous amounts of energy in the form of ground vibrations, which can destabilize rock faces in the quarry and foundations of nearby structures. Poorly designed or poorly controlled blasts can produce substantial fly rocks which can be projected long distances from the blast site. Fracturing of rock during blasting may result in increased rock mass permeability, and subsequent flooding of the quarry
<b>Nature (-/+)</b>	Negative
<b>Extent</b>	Local
<b>Duration</b>	Medium, based on the assumed life of the quarry of 5 years
<b>Intensity</b>	Medium (moderate effects), assuming that blasts are properly designed and controlled
<b>Probability</b>	Highly Probable
<b>Prevention</b>	Complete prevention is not possible for this impact
<b>Significance (no mitigation)</b>	Medium
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>• Blasting to be carried out using delay detonators which reduce ground vibrations</li> <li>• Ensure blast design is proper by using appropriate quantity of explosives, appropriate delay system, and suitable blast parameters with respect to burden, depth and spacing to avoid overcharging</li> <li>• Temporarily stop other activities in the immediate vicinity during blasting</li> <li>• Blasting to be done at designated times only</li> <li>• All nearby farmers, residents and the Hosea Kutako Air Control offices to be given timely notices for planned blasts</li> </ul>

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	<ul style="list-style-type: none"> <li>Blasts must be executed by suitably qualified and experienced personnel</li> </ul>
<b>Significance (mitigation)</b>	Low
<b>Confidence Level</b>	Medium
<b>IMPACTS ON HERITAGE</b>	
<b>Risk Event</b>	Potential disturbance and damage to unforeseen/ undetected archaeological or heritage sites during site clearance and quarrying activities.
<b>Description of Potential Impact</b>	Any archaeological or historic sites of significant importance within the MC that are damaged or destroyed would constitute an impact on the heritage of Namibia.  The procedure of 'chance finds' is to be followed where no known sites of importance are recorded for the MC area.
<b>Nature (-/+)</b>	<b>Negative</b>
<b>Extent</b>	<b>Site specific</b>
<b>Duration</b>	<b>Long term</b>
<b>Intensity</b>	<b>Minor effect</b> (no sites of importance are currently known)
<b>Probability</b>	<b>Improbable</b>
<b>Prevention</b>	Impacts of this nature are avoided especially if the site locations are known.
<b>Significance (no mitigation)</b>	<b>Medium</b>

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<b>Mitigation</b>	<ul style="list-style-type: none"> <li>A 'chance find' of any potential heritage site should be communicated to the police and the National Heritage Council of Namibia. If activities occur at the location where a 'chance find' has been made, then the activities should cease until the necessary authorities have visited the site and provided the go ahead to proceed with activities.</li> </ul>
<b>Significance (with mitigation)</b>	<b>Low</b>
<b>Confidence Level</b>	<b>Medium</b> - Knowledge of the whereabouts of heritage sites is not known.
<b>PUBLIC PERCEPTION</b>	
<b>Description of Potential Impact</b>	It is not possible to apply the assessment table to this issue. Public perceptions just need to be managed through good supply of information and publicity programmes

## **7.4 Cumulative Impacts**

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

The cumulative impacts to which the project would contribute are listed below:

- **Road infrastructure** (vehicular traffic): The proposed quarrying and crushing activities will contribute cumulatively to various activities such as commuting and possible traffic congestion along the B6 road, and add physical burden on the B6 tarred road due to increase in loaded trucks. The contribution of the proposed project to this cumulative impact is however not deemed to be significant given the scale and extent of the proposed project activities. Although most road users on the B6 are travelers (in vehicles of all sizes and types), the significance of the impact on the roads is placed mainly on the frequency of heavy trucks that would be transporting crushed aggregates as well as support products such as mechanical spares and solid waste to and from the proposed project site. The past, current and future use of the road infrastructure by other users and for different operations will be beyond the Proponent’s control. Therefore to ensure that the Proponent do their part to reduce this impact with regards to their project operations (heavy vehicle loads and frequency on the roads), they will comply with the legal obligations and requirements as set out by the Roads Authority in so far as permissible traffic loads are concerned. This will be achieved through weighing of loaded trucks on site prior to leaving site, and through consultations as recommended under the Permitting and Licensing Table in the EMP.

## **7.5 Decommissioning**

The decommissioning phase refers to the cessation of all quarrying and crushing activities as well as the removal and/ or rehabilitation of any support infrastructure at the proposed project area. Disturbance of the earth’s surface by any form of mining will result in complete removal of existing vegetation and ecosystems within the disturbed area. The impacts are significant, but localized to the disturbed area, and the overall extent of the impact is determined by the concentration of mining and the sensitivity and recovery rate of the disturbed ecosystems. During the operational phase of a quarry, the impact on the environment can be lessened by planning with future closure in mind.

The objectives of the quarry and crusher closure and decommissioning are to:

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- Provide a safe and stable landform compatible with the intended final use;
- Comply with relevant regulatory requirements and attain regulatory consensus on the successful closure and rehabilitation of the Project area;
- Complete the closure, decommissioning and rehabilitation works on an ongoing basis during the operations, and in a cost effective manner as much as possible whilst achieving the primary socio-economic and developmental objectives of the project.
- Produce a final “walk away” landform that is stable and that blends aesthetically into the surrounding landscape, yet as far as possible does not impend possible future land uses.

### 7.6 Site Rehabilitation

Proponent should keep the disturbed areas to a minimum; trees and other plants should not be removed unless necessary; selective quarrying should be adopted so that the entire site is not cleared and affected at once; backfilling and rock shading should be practiced while exhausted areas should be closed to the extent possible before opening new ones.

#### 7.6.1 Planning for Rehabilitation

Each quarry and crusher site will typically have characteristics that will influence the procedures adopted in the rehabilitation program. These characteristics may be obvious but critical differences are often only identified by careful investigation. The proposed post mining land-use will also influence the procedure and the plant species used for rehabilitation.

The following are the basic rehabilitation practices as summarized after the Minerals Council of Australia (2015), which with appropriate modifications, will apply to most disturbed areas.

1. **Making Safe:** After planning for rehabilitation, the first step is to clean up and make the area to be rehabilitated, safe. For this project this shall involve the following:
  - Removal of crusher and support infrastructure and unused or unwanted equipment from the affected site. No facilities or equipment should remain on site unless with the written approval of the landowner or relevant authority (i.e. the City of Windhoek’s Environmental Health Department and Environmental Commissioner’s Office).
  - Sealing or capping of all boreholes
  - Partial reclamation of quarry hole by backfilling with waste rock

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- Removal of all industrial and domestic solid and liquid waste for disposal at approved sites in Windhoek. Care is required with residual toxic or hazardous materials including contaminated packaging and containers
- 2. Pollution Control:** Progressive rehabilitation will be undertaken to stabilize disturbed areas as quickly as practical and to limit erosion, soil degradation, poisoning of fauna, and pollution of water sources. Collectively, this must involve the following:
- Restricting clearing to areas essential for the works required
  - Windrow vegetation debris along the contour
  - Minimizing length of time disturbed soil is exposed
  - Diverting run-off from undisturbed areas away from the working areas
- 3. Topsoil Management:** The site rehabilitation strategy may include the following measures which are designed to minimize the loss of topsoil material, which must be respread on rehabilitated areas thereby promoting successful vegetation establishment.
- Minimize the length of time that topsoil material is to be stockpiled.
  - Contour rip to encourage rainfall infiltration and minimise run-off.
  - Respread topsoil material in even layers at a thickness appropriate for the landform and land capability of the area to be rehabilitated.
  - Construct contour banks in accordance with the applicable landform design criteria to limit slope lengths and control run-off by avoiding soil compaction.
  - stockpiles shall be located in areas away from drainage lines or windy areas in order to minimise the risk of soil and wind erosion;
  - Rehabilitated areas of returned topsoil will be ripped to about 1 m depth, with care taken not to bring subsurface materials to the surface (e.g. large rocks). Ripping should only be sufficient to allow equipment to work efficiently. Ripping along slopes should be along contour to minimize erosion.

## 8 CONCLUSIONS

### 8.1 Summary

**Table 8-1** provides a summary of the impact assessment results from Section 7 above. For each potential environmental impact or issue, the significance is stated following the assessment in Section 7. Further investigations that have been recommended are summarised in "key word" form. These may need to be applied at one or more stages of the project life cycle:

- Construction,



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- Operations,
- Decommission and Closure

**Table 8-1. Summary of potential impacts or issues**

Environmental Impact/ Issue	Significance Level (post mitigation)	Further Investigation or Monitoring Recommended
Impact of blasting on personnel and aviation due to fly rocks	Low	Blasting risk assessment undertaken by blasting specialist, Air control department and proponent
Impacts of slope instability	Medium	Regularly conduct slope stability assessment by a geotechnical specialist
Impacts on soil degradation and erosion	Low	A detailed site layout plan of the quarry and all infrastructure to facilitate management
Impact on land use change	Low	-
Impact on topography and landscape	Low	A mining plan and schedule required to optimize management
Impacts on vegetation	Medium	Practice selective mining; Monitor rate of natural re-vegetation or recovery;
Impacts from solid waste	Low	Monitor effectiveness of disposal systems; Monitor litter on site
Impacts on Indigenous Fauna	Low	Record all animal fatalities
Impacts on Air Quality	Medium	Implement dust level monitoring
Impacts of noise & vibrations from quarry	Low	Design of drilling and quarrying equipment
Impacts of noise & vibrations from crusher & moving machinery	Low	Design of crusher and all machinery; install sound proof canopies where possible
Impact on Surface Water	Low	Monitor water quality in quarry and downstream of quarry/ crusher

Impacts on Groundwater	Low	Periodic water quality testing and monitoring
Impacts on Occupational Health and Safety	Low	Technological and PPE solutions to comply with dust and noise standards
Potential Security Issues	Low	Establishment of access control points; Enforce in Conditions of Employment
Visual Impacts	Low	-
Impacts on Heritage	Low	Implement chance find practice
Public/ Neighbour Perception	Low	Maintain transparency and open/ timely communication

## **8.2 Environmental Economics Criteria**

A final qualitative assessment is considered in terms of the criteria used in the field of Environmental Economics. These criteria are explained by Stauth (1983), namely:

- the *Efficiency criterion*,
- the *Equity criterion*, and
- the *Intergenerational Equity criterion*.

**Efficiency**: A project is considered to be efficient if it brings about a net benefit to society. If some people are made better off without anyone else being made worse off, then a project is considered efficient in environmental economics terms.

The project will bring significant economic benefits to the area of Windhoek and Namibia at large– including benefits to people in terms of employment and secondary industrial and commercial opportunities. Increased spending power of employees will further help to increase the market opportunities, which will further enhance the regional economy. Taxes to the Namibian Government will benefit the country as a whole.

The efficiency of the project could be enhanced if local contractors and sub-contractors are hired to provide secondary services such as cleaning, cooking, plumbing and electrification of working areas, and transportation of crushed aggregates to the market place. This would provide an opportunity for further business development.

**Equity**: The equity criterion relates to the distribution of costs and benefits in the affected

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society. A project is equitable if it brings about a situation in which the distribution of social well-being is improved.

The project will benefit local people without disadvantaging them in any way. They will not suffer any displacement or loss of land or be subject to adverse health conditions. The distribution of benefits will be somewhat limited. Direct benefits will include remuneration to employees, surface lease to farm owners, while indirect benefits would include increased work opportunities in the supporting industries and services.

The distribution of benefits could be greatly enhanced if secondary support services are outsourced to local contractors. The creation of small businesses would provide opportunities for people to learn business management skills as well.

**Intergenerational Equity (or Sustainability)**: This criterion considers the economic impacts on future generations – i.e. it extends the considerations of equity to future generations. Thus a project should be able to make the present generation better off without making future generations worse off. It should be able to provide benefits to future generations without degrading the resource base that the society depends on for its wellbeing. It has been established by Eagle Focus that the raw materials of quartzite on site are sufficient for well over 50 years. Groundwater resources are renewable within certain limits of abstraction, and this resource appears to be adequate for the project's needs, based on the yields of surrounding farm boreholes.

However ongoing monitoring of groundwater is recommended during operations to confirm that this resource is sustainable in the long term, even with the effects of climate change.

The project poses no significant threats to human health, the health of domestic livestock or wildlife and birds, provided that the proposed control measures are effectively implemented.

### **8.3 Closing Remarks**

The aim of this environmental scoping assessment was to identify the potential impacts associated with the proposed quarrying and crushing activities on mining claim 72245, assess their significance and recommend practical mitigation measures. The public and all directly affected stakeholders were consulted as required by the EMA and its 2012 EIA Regulations (Section 21 to 24). The public was informed via the three newspapers advertisement used for this assessment; site/public notices placed in the project site area, relevant local and regional offices notice boards, as well as email and SMS communications to identified and registered I&APs.

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One-on-one interactions were held with neighboring farmers. The interested and affected parties raised their comments and concerns on the proposed project activities. The concerns and comments received from the public and the local community members formed the basis for this report as well as the accompanying EMP.

Overall, due to the nature and localized scale of the proposed activities, and the environmental context of the site, the potential environmental and social effects are limited and unlikely to be significant.

Based on this and the residual significance of the impacts identified after implementing proposed mitigation measures, it is recommended that an Environmental Clearance Certificate can be issued for the proposed quarrying and crushing activities on mining claim 72245; subject to the implementation of the management and mitigation measures outlined in the accompanying EMP report.

## 9 REFERENCES LIST

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**APPENDIX A: BACKGROUND INFORMATION DOCUMENT**

**APPENDIX B: CURRICULUM VITAE (CV'S) OF THE  
RESPONSIBLE ENVIRONMENTAL ASSESSMENT PRACTITIONER  
(EAP)**

**APPENDIX C: CONSENT LETTERS/ DOCUMENTATION FROM  
RELEVANT AUTHORITY**



**APPENDIX D: LIST OF IDENTIFIED AND REGISTERED  
INTERESTED AND AFFECTED PARTIES**

**APPENDIX E: NEWSPAPER ADVERTS/ NOTICES FOR THE ENVIRONMENTAL ASSESSMENT PROCESS**

**APPENDIX F: CONSULTATION MEETINGS REGISTER AND  
COMMENTS FORMS RECEIVED FROM I&APS**

**APPENDIX G: ORIGINAL FORMATS OF ISSUES,  
CONCERNS AND COMMENTS AS RECEIVED FROM THE  
I&APS**

**APPENDIX H: ENVIRONMENTAL MANAGEMENT PLAN  
(EMP)**