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ENVIRONMENTAL SCOPING ASSESSMENT (ESA) REPORT

Prospecting of Dimension Stone Quality Granite and Dolerite on Exclusive Prospecting License (EPL) 6217 in the Erongo Region, Namibia

MEFT Application No.: APP – 002499

Document Version: **Final**

Proponent: JTD Mining Group

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EXECUTIVE SUMMARY

JTD Ming Group (hereinafter referred to as the *Proponent*) intends to commence prospecting for dimension stone quality granite and dolerite on EPL 6217, which overlies Farm Nudanab and the Omihana/ Otjimboyo area in the Region. The dolerite unit exists as isolated koppies covered by abundance of loose black stone (dolerite) boulders and sparse vegetation, and to a less extent as linear dykes within the granitic plutons. On the other hand, the granite occurs as plutons of varying relief across the EPL area.

The proposed prospecting activities will primarily involve rotary core drilling and test quarrying by means of blade saw butterfly cutting in selected spatially constrained areas. Drilling is aimed at recovering core which will be used to assess the thickness of the targeted rock units as well as to assess the colour and fracture frequency in these rock units. Butterfly cutting on the other hand is aimed at extracting sizeable sample blocks of granite and dolerite to evaluate key parameters such as fracture frequency, colour patterns and the minimum block size extractable.

The proposed activities are listed activities under the Environmental Management Act (EMA) No. 7 of 2007 and its 2012 Environmental Impact Assessment (EIA) Regulations, and 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 undertake an Environmental Impact Assessment (EIA) and compile technical reports that would support application for an Environmental Clearance Certificate (ECC) from the Ministry of Environment, Forestry and Tourism.

This document contains all the information that was gathered during 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 impact management measures.

Key potential impacts identified for the project

The following adverse impacts are envisioned from the proposed prospecting activities:

- Potential safety risk to workers, farmers and animals due to instability of test quarry side walls and excavations left open.
- Physical disturbance and degradation of soils.
- Physical disturbance of topography and general landscape.

- Conflicting land use between nature conservation, subsistence farming and mining.
- Impact on air quality (due to dust generation and gaseous emissions).
- Impacts on biodiversity (forced migration of fauna; removal of flora; damage to vegetation due to veld fires, slowed plant growth due to increased dust cover, potential poaching).
- Potential increase in noise level from project activities, resulting in nuisance of residents.
- Impact on aesthetic value (mainly due to lighting at nigh).
- Potential environmental pollution (due to oil spills, littering, soil erosion, etc).
- Potential disturbance and destruction of unforeseen archeological/heritage site.
- Occupational health and safety issues and risks.
- Compromise on security due to increased population of people in the area.
- Potential manipulation of vulnerable women and children.
- Risk of not rehabilitating the affected sites after proposed activities have ceased.

Other impacts identified include:

- Compromised relationships between the proponent and landowners due to poor communication channels between project proponent, leadership of communal conservancies and the affected community.
- Increased strain on farm and surrounding services infrastructure such as access roads.

Potential positive impacts anticipated from the proposed project are as listed below:

- There are prospects of setting up a solar powered stone cutting factory within the EPL if prospecting yields positive results. This has a potential to uplift the socio-economic standards and livelihoods of the surrounding communities.
- Potential development and transfer of skills.
- Upliftment of local businesses through procurement opportunities for support services and products.
- Improved geological understanding of the area.
- Increased awareness of the economic value of mineral resources amongst affected communities.

- Contribution towards local and national economy through the payment of taxes and license levies to the responsible local authorities (i.e. Daure Daman and Zeraeua Traditional Authority) and institutions of the Government of the Republic of Namibia (e.g. MME).

Based on the systematic impact assessment completed, the adverse impacts were found to have a low to moderate level of significance, after implementation of the recommended mitigation and management measures.

Key Conclusions and Recommendations

Based on the assessment carried out and extensive engagements with the affected communities and competent authorities, it can be argued that the proposed exploration phase will not yield high levels of bio-physical environmental damage and if the various impact management and mitigation measures recommended in this report are effectively implemented, the adverse impacts can be reduced to acceptable levels. It is envisioned that the disturbed footprints from access roads, drilling and test quarrying are not expected to cause irreversible harm to the environment. Drill holes, access roads and test quarries can be fully rehabilitated, would re-vegetate after rainfall seasons if the proposed measures are implemented as suggested in this report. Henceforth, the proposed exploration activities are expected to be undertaken in an environmental sustainable manner.

For the above reasons, it is recommended that an Environmental Clearance Certificate may be issued for the proposed activities, subject to the following conditions:

- All required permits, licenses and approvals for the proposed activities are obtained and are valid as required. These include permits and licenses for land/farm access; removal of protected plant species; and all other necessary documentation for ensuring compliance with the specific legal requirements provided in this document.
- The management actions, monitoring plans and rehabilitation measures outlined in the EMP are implemented, and monitoring is effectively conducted.
- A condition is included in the ECC granted that the Proponent must comply with the legal requirements governing this type of project and its associated activities.

- All the necessary environmental and social (occupational health and safety) precautions recommended in the scoping and EMP reports are adhered to.
- Accountability is enforced and upheld on the project proponent to comply with measures outlined in the EMP.
- The proponent shall continuously (once a year) update the EMP report to reflect site conditions as the project progresses.
- Within 10 calendar days of an incident, spill and/ or emergency, a report shall be submitted to the DEAF stating the following:
    - Nature and cause of the incident;
    - Effects of the incident, including environmental impacts, losses, casualities, descriptions and costs of damages;
    - Corrective measures (to be) taken to alleviate the situations;
    - An estimate as to when the situation shall be completely resolved;
    - Steps to be taken to reduce the probability or completely prevent a recurrence.
- An ECC Renewal application should be launched **at least 3 months** before the expiry date of the valid ECC to allow time for the evaluation of the ECC Renewal report by the DEAF.

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DEAF	Department of Environmental Affairs and Forestry
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EPL	Exclusive Prospecting License
ESA	Environmental Scoping Assessment
EMP	Environmental Management Plan
EMA	Environmental Management Act
ECC	Environmental Clearance Certificate
JTD	JTD Mining Group
I&APs	Interested and Affected Parties
MAWLR	Ministry of Agriculture, Water & Land Reform
MEFT	Ministry of Environment, Forestry and Tourism
MME	Ministry of Mines and Energy
OGGC	OMAVI Geotechnical and Geo-environmental Consultants cc
TA	Traditional Authority

1 INTRODUCTION

The **JTD Mining Group** (herein referred to as the Proponent), intends to undertake prospecting/ exploration and apply for a Mining License in order to ultimately undertake dimension stone quarrying and cutting activities on Exclusive Prospecting License (EPL) 6217. The EPL 6217 was granted in June 2020 for dimension stone and will expire in June 2023. The planned prospecting activities will cover various geological exposures of granite and dolerite within the EPL area, while the likely mining license area will be confined to certain areas of the EPL where prospecting yields success results in terms of stone quality. The exploration activities and results leading to the preparation of feasibility study for the EPL will include techniques such as detailed geological mapping, rotary core drilling, hand-specimen sampling, trenching and test quarrying to extract 10 m^3 sample blocks. Following the completion of the feasibility study, the proponent intends to apply for a mining license in order to develop granite and dolerite quarries, as well as a supplementary stone cutting factory. The quarrying (mining) phase which does not form part of the scope of this report will involve the quarrying of blocks, sorting, on site storage and cutting, transportation of the blocks to factories in Karibib and Walvis Bay for final processing, and finally exporting of finished products.

The planned prospecting and quarrying activities are listed in the Environmental Management Act(EMA) of 2007 and its EIA regulations of 2012, and cannot be conducted without a valid 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 EMA and its Regulations. The assessment aims to identify and realistically manage, mitigate and/or enhance physiographical, ecological, socio-economic and heritage related impacts that could manifest from the proposed activities. This is done to ensure that the project's activities are implemented in an environmentally and socially friendly manner to ensure sustainability of resources in the affected area, and to reduce adverse impacts to acceptable levels, while maximizing potential positive impacts (benefits) from the projects.

The concerned EPL is located about 8km north east of the small town of Uis in the Daure Constituency, Erongo Region; at approximate coordinates 21□5'05"S and 14□57'24"E. The EPL approximately measures 18 834 Hectares (Ha) in size and can be accessed via the existing D3714 and D3715 gravel roads as well as via numerous smaller farm car tracks.

This scoping report aims to firstly establish the baseline conditions of the receiving environment; and thereafter identify and systematically assess potential environmental impacts associated with various stages of the proposed prospecting program on EPL 6217. The accompanying draft Environmental Management Plan (EMP) provides recommended impact management, mitigation and monitoring measures to minimize and/ or mange significance levels of adverse impacts, where complete avoidance is not possible. The draft EMP further outlines measures that must be implemented to ensure that potential positive impacts are either sustained or enhanced over the duration of the proposed prospecting program. Collectively, these documents will then support the Proponent's application for an environmental clearance certificate (ECC) from the Ministry of Environment, Forestry and Torusim (MEFT) and the Ministry of Mines and Energy (MME) to permit the planned activities. The two (2) documents 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

The proponents of this project ultimately seek to supply dimension stones to Best Cheer Namibia's (herein referred to as BC stones) stone processing factory in Walvis Bay and or Karibib, which is presently the largest natural stone beneficiation factory in SADC. The processing factory presently employs a total of 84 personnel, over 90% of who are Namibians, and exports fully processed natural stone products such as counter tops, tiles and slabs to the USA, China and Europe. In order to sustain the production throughput and life of the facility BC stones through its exploration and mining technical partner (namely, JTD Mining) endeavours in continuous prospecting for suitable natural rock. This is to ensure that the multi-million dollar beneficiation facility has a sustained supply of natural stone blocks for processing. This alone is the primary reason why the proposed prospecting of suitable natural rock for dimension stone production on EPL 6217 is deemed necessary.

Although prospecting for industrial minerals such as coarse feldspar, rose quartz and durable rock for construction aggregates are covered under this prospecting license and may be considered in the proposed project scope; their relevance is secondary and will principally be driven by industry demand. For now the primary focus is on dimension stone.

Holistically, the proposed project is desired because of the following potential benefits:

- The project could contribute towards sustained national economic development through sustained employment and government revenue through taxes realised from the BC stone factory as well as from export duties.
- The project could contribute towards sustained national economic development through sustained revenue from license levies.
- The project could contribute towards local economic development and livelihood improvement through the creation of 10 to 15 jobs, potential transfer of technical skills (such as operation of heavy machinery) to young community members, and surface lease levies payable to the Daure Daman Traditional Authority for the duration of any activities on this license.
- The exploration license holder, with whom JTD Mining is a technical partner and financier, is a previously disadvantaged Namibian. If exploration yields positive results, the project will result in the empowerment of a previously disadvantaged Namibian and contribute positively towards the government's Black Economic Empowerment (BEE) policy at large.
- In the long run if exploration yields positive results the project could boost local businesses such as:
    - Local transportation businesses as sub-contractors would be used to deliver blocks of stone to the stone processing facility
    - Mechanical services for mechanical repairs

- Security services for safeguarding the site

1.2 Project Location

EPL 6217 is located about 8km north east of the small town of Uis in the Daure Constituency, Erongo Region; at approximate coordinates 21□5'05"S and 14□57'24"E. The EPL approximately measures 18 834 Hectares (Ha) in size. The area can be accessed via existing gravel roads such as the C35, D3714 and D3715 as well as via several smaller communal farm access roads. The license exclusively lies on communal land under the jurisdiction authority of the Daure Daman (southwestern portion) and Zeraeua Traditional Authority in the Daures Constituency and overlies two (2) communal conservancies, namely: the Tsiseb and Otjimboyo conservancies, which gained their significance from the Ugab River Valley, the Brandberg, white lady rock paintings and a petrified forest. The Ohungu communal conservancy lies to the east of the concerned EPL, while the famous Otjihorongo reserve is found within Otjimboyo conservancy towards the northern portion of this conservancy (refer to **Figure 1-1**)

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

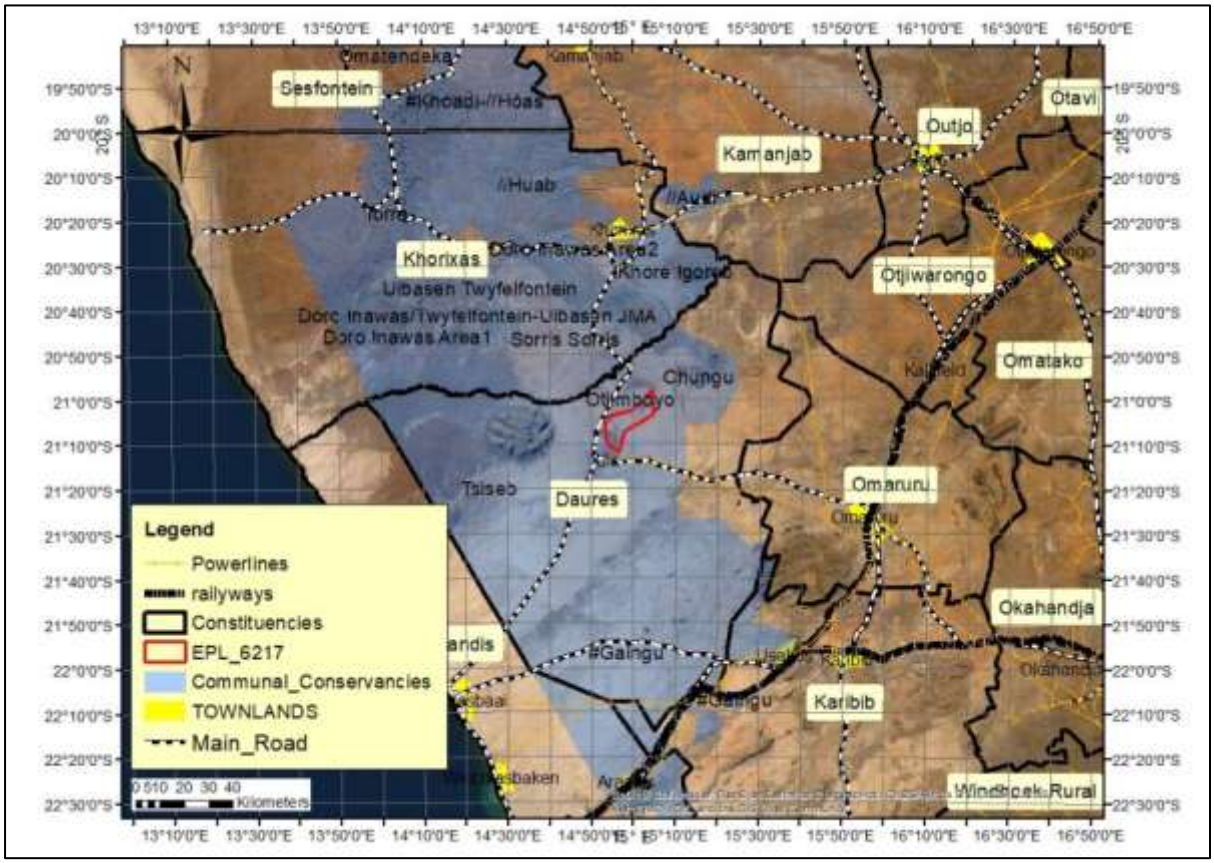

Figure 1-1. Regional locality map of EPL 6217

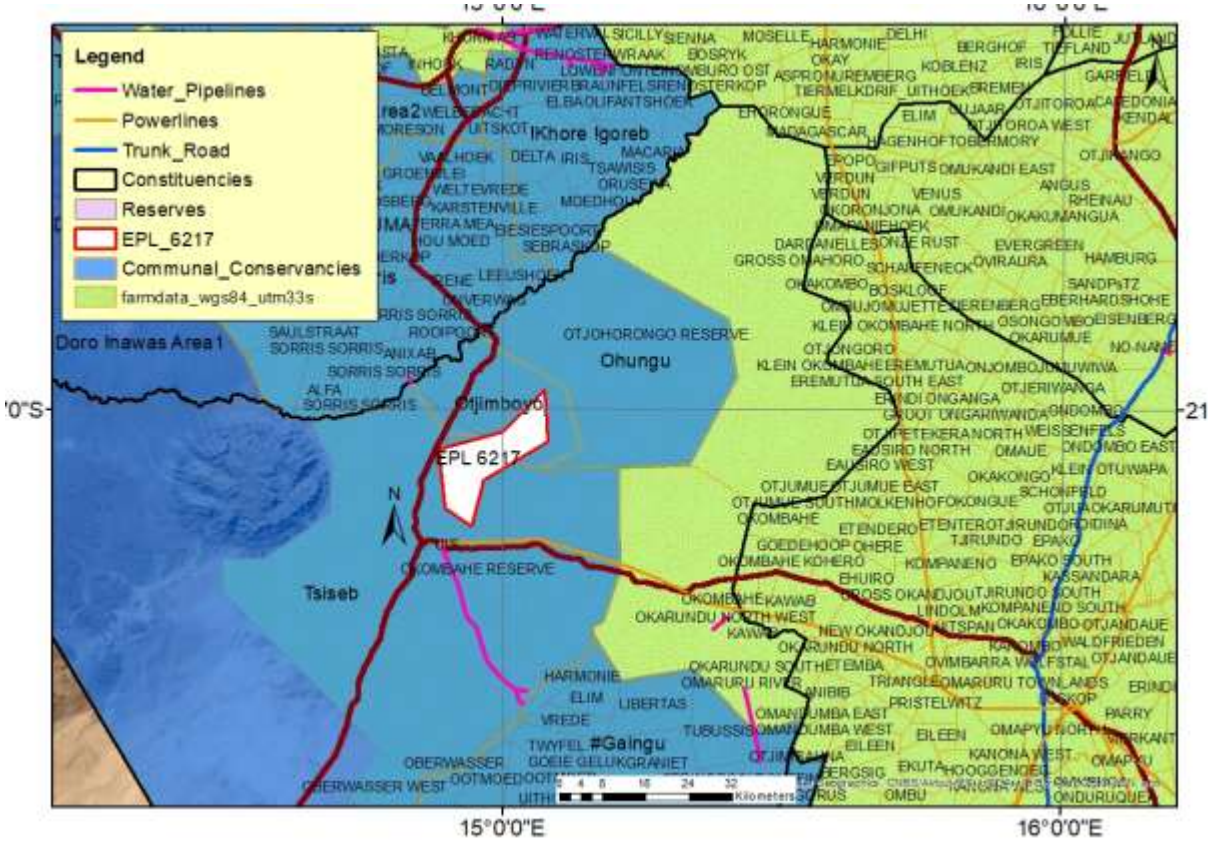

Figure 1-2. Local map of EPL 6217

Table 1-1. Approximate corner coordinates for EPL 6217

EPL CORNER COORDINATES
• 21°4'06"S/ 14°53'06"E
• 21°2'25"S/ 14°59'57"E
• 20°57'59"S/ 15°4'24"E
• 21°3'13"S/ 15°4'58"E
• 21°7'01"S/ 14°58'01"E
• 21°11'45"S/ 14°56'34"E
• 21°9'54"S/ 14°54'06"E

1.3 The Proponent

EPL 6217 belongs to the JTD Mining Group, and the proposed prospecting activities shall be carried out by this entity wholly.

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 carry out an Environmental Assessment (EA) and submit the required documentation for supporting 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

In accordance with the "Namibian EIA guidelines for mining sector of November 2019" as well as the "the Namibian reporting guidelines for environmental assessment of 2018" the 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 APP-002499**) and notification of the commencement of the EA process to all identified and registered interested and affected parties (I&Aps).
2. Invitation / notices to identified and registered interested and affected parties (I&Aps) and the general public to participate in the environmental assessment process for the project, through local newspaper advertisements, Damara-Nama and Otjiherero radio announcements, as well as via direct email, SMS and telephonic call communications to key stakeholders and authoritative institutions such as Line Ministries (MME, MEFT, Ministry of Water, Agriculture and Land Reform), Regional (Erongo) and Local Governments (Daures Constituency and Uis Town/ Settlement Council), and affected Traditional authority (Dauren Daman Traditional Authority, Tsiseb and Otjimboyo Conservancy) and farm/land owners or occupiers of land.
3. Compilation of the Draft Environmental Scoping Assessment (ESA) and Environmental Management Pan (EMP) reports (consolidating all findings from the I&APs/public consultations, and based on project information provided by the proponent, literature research conducted and field observations **Appendix H**.
4. Circulation of the draft ESA and EMP reports to all identified and registered I&Aps for review, comments and final input prior to submission to the relevant Competent Authorities
5. Incorporation of comments from I&APs on draft reports and finalization of the reports
6. Submission of the ESA and EMP reports, including all appendices to the report to the Department of Environmental and Forestry Affairs, via the MEFT's online portal, 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.
7. Notification of all registered Interested and Affected Parties (I&Aps) confirming that the ESA and EMP reports have been submitted to the MEFT's EIA online portal for final public review and evaluation by MEFT.

8. If the ECC is granted, all I&APs will be informed of this outcome. Similarly, if the ECC is not granted communication to all I&APs will be made.

The overall environmental assessment process that was followed is illustrated schematically **in Figure 1-3**.

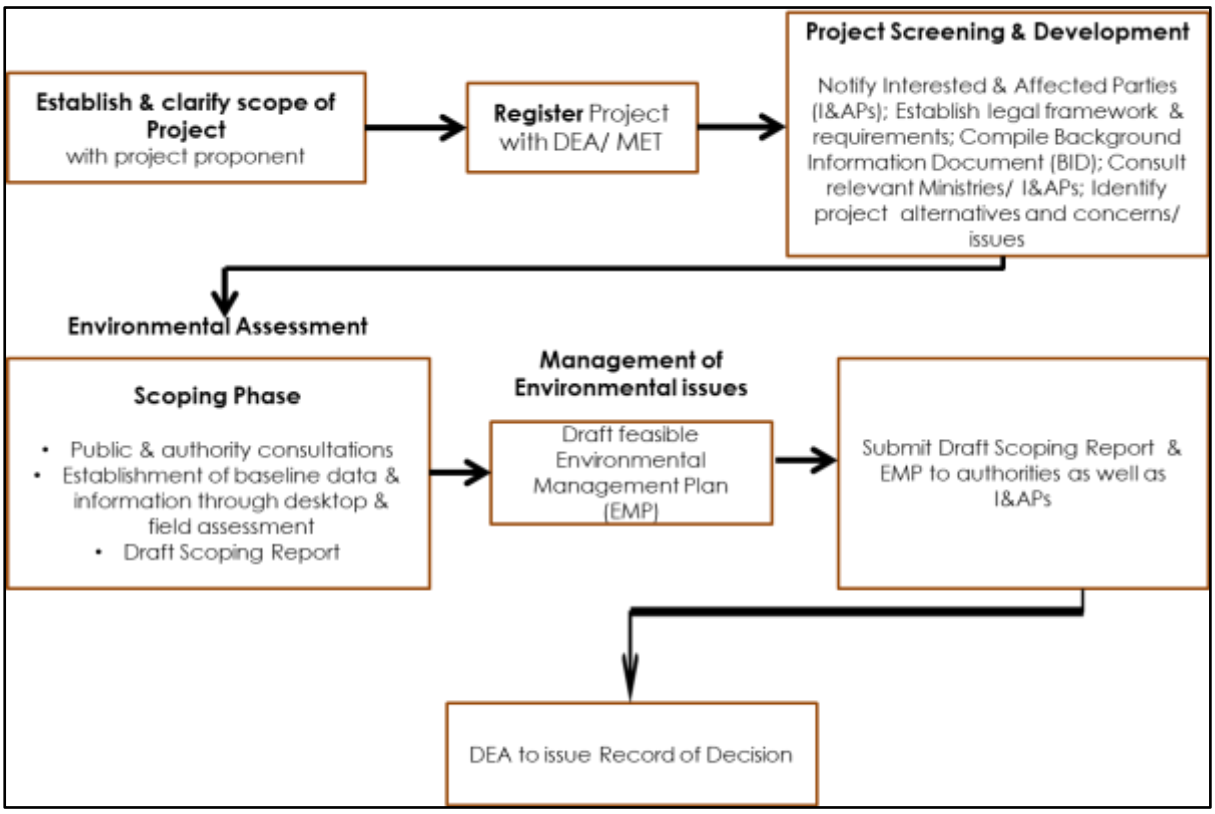

Figure 1-3. Schematic process flow of the Environmental Assessment Process Followed

2 PROJECT DESCRIPTION, ACTIVITIES AND PROCESSES

Dimension stone which the basis of this assessment and document, is a collective generic term used for various natural stones used for both structural and decorative purposes in the construction industry. Based current market demands the main rock types presently quarried for dimension stone production in Namibia include granite, marble and dolerite; which are primarily exported in both raw and processed form to both regional and overseas markets such the Zambia, DRC, USA, Europe and China. It is crucial to emphasise that unlike other mineral resources, the economic viability of a dimension stone deposit is highly influenced by the quality (i.e., pattern, fracture frequency, extractable block size, colour, etc) of the rock mass involved because this single attribute dictates the price a block, slab or counter top can fetch on the market. For this reason, prospecting for dimension stone deposits must always include the extraction and subsequent beneficiation of a few blocks for purposes of testing market desirability and demand for blocks or slabs with that specific colour or pattern.

A desktop study coupled with limited walkover field evaluation has already been conducted over the EPL, and as a result the proponent already has an idea of where the seemingly promising granitic and doleritic intrusions are occurring within the license area. A designated site, located within close proximity to some of the promising outcrops, has preliminarily been identified for the placement of an exploration camp. This camp will comprise of a few 6 and 12 m mobile heat insulated containers which will be used as accommodation quarters, store rooms, kitchen, site office, and ablution facilities to support the proposed exploration program. The proposed prospecting activities will broadly involve the following:

- setting up of an exploration camp at the selected spot within the EPL; creation of small access track roads from the M76 gravel road and exploration camp to selected mountain ranges and rock exposures within the EPL;
- possible surface clearing and stripping of boulders, and vegetation and/ or top soil to access less weathered and less fractured bedrock at depth in areas where bedrock is not well exposed;
- Stockpiling of topsoil close to where such excavations are made for latter usage in rehabilitation earthworks;
- vertical core drilling to establish the thickness, colour consistency and fracture frequency of the targeted rock mass and;
- ultimately cutting out of sample granite and dolerite blocks by means of butterfly blade cutting technology. This will be done to extract sizable blocks that can be cut and polished into slabs, counter tops and or tiles for deployment to target markets to test the market's demand and price.

Where results from core drilling and extraction of sizable sample blocks from butterfly cutting yield positive results (i.e., where the rock mass is found to be of good quality in terms of colour, patterns and fracture frequency), such areas will be demarcated for possible mining at a later stage upon the granting of a mining license. On the other hand, where exploration results suggest that the rock mass is not desirable for good market performance, immediate rehabilitation of any drilled and or test quarried sites by means of butterfly cutting will be implemented to restore the conditions of those sites. Rehabilitation work will largely involve closing off any excavations, covering up the surfaces of such areas with in situ topsoil and boulders, and running rippers along access roads to those sites to loosen up the traffic compacted soils before closing such roads off. It is important to emphasise that immediate and ongoing rehabilitation will be easily achievable, since the evaluation of a rock mass quality would be done instantly on site through visual assessment of core and sample blocks from drilling and test quarrying by the proponent's geologist. This practice will in turn make it possible for immediate and timely decisions to be made on whether a particular site or outcrop should be closed up and rehabilitated, or be preserved from possible quarrying at a later stage.

The above mentioned prospecting activities are expected to carry on for the duration of the validity period of the prospecting license (i.e. 3 years), after which a decision will be made as to whether the proponent shall proceed to mining phase or switch to complete decommissioning based on the prospecting results obtained and economic feasibility of mining. Decommission will 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)

Surface clearing and test quarrying within spatially focussed patches on the targeted koppies as well as overburden stripping will require the use of one (1) rotary core drill rig, on (1) excavator, two (2) wheeled front-end loaders, one (1) bull dozer, one (1) 20m^3 tipper truck and two (2) diesel powered butterfly blade cutters in order to access targeted bedrock at depth and extract sizable sample blocks. All the earth moving plant as well as the drill rig and butterfly blade cutters will be powered by a 330kw diesel engine generator on site and will be fuelled with diesel stored onsite in a 1000 to 2000L trailer-mounted tank. Water supply for both domestic consumption and exploration activities will be sourced from Uis using a water bowser which will take about 7 000L to 10 000L of water to site on a weekly basis during initial exploration (i.e. during the drilling phase). Once exploration ramps up to test quarrying, the weekly water demand is anticipated to increase to approximately 10 000L to 15 000L, depending on the porosity and fracture frequency of the rock masses be drilled or cut, etc. This water will also be carted to site from Uis to support the exploration program. Some of the water used during the drilling and butterfly cutting processes will be recycled and reused for the same purpose, thereby helping to reduce burden on the water supply source. One (1) 5 000L storage water tank will be installed near the exploration camp for domestic water supply, and will be re-filled as and when the need arises. Another two or three 5 000L tanks will be mounted to trailers and these will be used to supply water at active drilling and or test quarrying sites. It is important to emphasise at this stage that because the proposed drilling and test quarrying methods shall be wet processes, there will be negligible amount of dust associated with these processes. Any sizable (up to 10 m^3) blocks extracted from selected sites during test quarrying will be transported on flatbed interlink trucks to processing facilities in Karibib or Walvis Bay for further beneficiation before being dispatched to target markets to permit evaluation of the product's demand and price. In order to minimize the likelihood of unnecessary ground disturbance, intrusive exploration activities such as drilling and test quarrying will be confined to areas with outcrop or shallow bedrock exposures.

It is anticipated that between 10 and 15 people will work on the site. These personnel will primarily include operators of various machinery and 1 cook.

2.2 Resource Outputs

The final products from the proposed prospecting program include the following:

- A refined geological and layout map with clearly labelled targeted rock units for prospective quarrying
- Core recovered from exploration drill holes
- Sizable sample dimension stone blocks for further processing to help test their market demand

- A feasibility study memorandum stipulating viability for continuous quarrying as informed by exploration results.

3 PROJECT ALTERNATIVES

This section explores alternatives that were considered and weighed up in this scoping assessment, as well as a high level indication of those options 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.

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 that were considered for this project relate to:

- Project location.
- Exploration and test quarrying techniques 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 social and economic factors.

- **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 a particular option.
- **Socio-economic limitations** – where socio-economic factors such as distance to processing facilities or markets, availability of infrastructure, current and future land-use, cultural significance, presence of heritage/ archaeological sites, and impacts on livelihoods may hinder or enhance consideration for a particular option.

These are considered below with reference to the context of this project.

3.1.2 Project Location Alternative

The location of the broader prospecting license 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. On top of this, the spatial locality for prospecting activities is constrained to areas over which the proponent holds mineral prospecting rights. Accordingly, the proponent chose to explore and test quarry granitic and doleritic host rocks found on EPL 6217 because of the massive occurrence of these rock units within the EPL boundaries, the seemingly promising lateral and depth (thickness) continuity of these units, their seemingly good degree of durability, and the close proximity of the site to major access infrastructure such as the C35, D3714 and D3715 gravel roads.

During the targeting or siting process, an alternative *open* location with similar rock deposits and in areas close enough to the much needed access road infrastructure could not be found. Furthermore, the proponent is restricted to only perform prospecting activities within the boundaries of the prospecting area over which they legally have rights 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 was not a viable option in this case.

3.1.3 Alternatives to prospecting methods and technologies

The primary methods of exploration proposed for this project are rotary core drilling and test quarrying using butterfly blade cutting equipment. Where bedrock is exposed on the surface these activities will commence right away without any surface clearing or stripping. However, in areas where the target rock units are slightly covered by soil or boulderly overburden, these actvities will be preceded by bulk excavation and stripping of the overburden soil or loosened boulders to access fresher bedrock at depth. Where test quarrying is performed sizable blocks extracted will then be carted off the site by flatbed interlink trucks for further beneficiation. These are the most conventional and most practical methods (from an efficiency and economic vew point) used in the dimension stone industry worldwide to probe the economic viability of a deposit for dimension production. For these reasons, no other alternatives were considered in so far as the technology and methods to be used are considered.

3.1.4 Alternatives to support infrastructures

Alternatives were considered for the different support infrastructures required to achieve the intended end goal without investing too many resources before economically viable deposits are found. In this regard alternatives to support infrastructure such as access roads, locality of exploration camp, water and power sources, ablution facilities, and fuel storage were considered. Due consideration was given to technological, economic, and environmental limitations of various infrastructural components 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

Category of Infrastructure	Alternatives Considered	Justification for selected option
Access roads	Create new access roads from the C35, D3714 & D3715	-to minimize project costs, environmental damage and project risk it was decided that prospecting activities should utilize existing road infrastructure as much as possible and only create smaller additional access roads to access sites where no new roads exist.
	Use existing farm access roads from the C35, D3714 & D3715 as much as possible	
Ablution facilities	Install fixed facility with septic tank	-To avoid long-term visual impacts & minimize rehabilitation costs portable container facilities were selected as the best option
	Portable facilities with septic tank	
Water supply	Use existing boreholes if any available on site	-During prospecting phase cart water from Namwater line in Uis as existing boreholes in the area have low yield
	Drill new borehole	
	Bring water from Uis	

Category of Infrastructure	Alternatives Considered	Justification for selected option
Diesel storage	Install fixed above-ground diesel tank on site	-During the prospecting phase use trailer mounted diesel tank as that is more economical than purchasing a large storage tank before any prospective quarrying reserves are established.
	Trailer mounted diesel tank with a containment bund	
Power supply	Diesel generator	-Most practical & economically option during exploration 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 exploration is positive and an upside product demand is proven or justified
	Install photovoltaic solar panels	
	Connect to nearest 3-Phase grid or substation	
Container Site Office, Storage and Worker accommodation	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 viable due to high CAPEX and long terms visual impact
	Offices off-site	Not ideal or preferred as office or accommodation need to be at production site to enable ease of responding to exploration demands
Cut out blocks or not	Cut out sample blocks for further beneficiation to fully assess rock mass quality and demonstrate product to potential markets	This is the most favoured option as clients always want to first see the final product
	No cutting of sample blocks. Rely solely on rock core to evaluate rock mass quality for dimension stone production viability	Option not favoured as rock core can miss weak and fractured zones. Additionally, it does not allow the proponent to demonstrate final product to prospective markets

3.1.5 No-Go Alternative

The "no action" alternative implies that the status quo remains, and nothing happens. Should the proposal to prospect for suitable granite and dolerite rock for possible dimension stone product on EPL 6217 be discontinued, none of the potential impacts (both 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 loses that may never be realized if the proposed project does not go ahead include:

- Potential continued shortage of blocks for beneficiation at the processing factories, which may contribute to undesired closure of such facilities in the medium to long run.
- 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 businesses through sub-contracting agreements such as provision of site security services, sourcing of fuel from local fuel retail facility, support to grocery stores in Uis, etc.

Considering the above losses, the "no-action/go" alternative was not considered a good option for socio-economic development of the two affected areas, Tsiseb and Otjimboyo. 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

Within the Republic of 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 Mineral Prospecting and 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 and Forestry Affairs 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.**

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
Relevant Acts		
The Constitution of the Republic of Namibia (1990)	Government of the Republic of Namibia	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: • Guarding against over-utilisation of biological natural resources. • Pursuing sustainable natural resource use • Limiting over-exploitation of non-renewable resources. • Maintaining biological diversity • Ensuring ecosystem functionality. • Protecting Namibia's sense of place and character. 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 advocate for sound environmental management as set out in the Constitution.
Environmental Management Act No. 7 of 2007 and its 2012 EIA Regulations Government Notice 28-30	MEFT: DEFA	Part 2 of the Act sets out 12 principles of environmental management, summarized as follows: • Community involvement in natural resources management, must be promoted and facilitated. • The participation of all I&APs must be promoted and decisions must consider the interest, needs and values of all I&Aps to promote transparency. • Equitable access to environmental resources must be promoted and the functional

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
		Relevant Acts
(Government Gazette 4878		integrity of ecological systems must be considered to ensure sustainable systems. • Assessments must be undertaken for activities which may have significant effects on the environment or the use of natural resources. • Sustainable development must be promoted in all aspects relating to the environment. • Namibia's cultural and natural heritage including, its biological diversity, must be protected and respected. • 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. • The reduction, re-use and recycling of waste must be promoted. • 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. • 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 • Damage to the environment must be prevented and activities which cause such damage must be reduced, limited, or controlled. 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

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
Relevant Acts		
		the Act, are triggered by the proposed activities.
Mineral Prospecting & Mining Act (Act no. 33 of 1992)	MME	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: • 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 • That the mining license holder is liable to pay compensation where in course of the exploration or mining operations; any damage is done to the surface of land, water source, cultivation, building or any other structure • 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 • 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. • 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 • That the mineral or mining license holder shall report pollution in course of any mining or prospecting operations and make remedial measures for such. The abovementioned provisions are all relevant to the proposed activities and were thus considered in the ESA process and drafting of the EMP.
Charter for Sustainable and	The Namibian Chamber of Mines of Namibia	This charter aims to facilitate meaningful participation of historically deprived Namibians in the

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
Relevant Acts		
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	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. The proposed prospecting activities would not entail the discharge of large quantities of gaseous pollutants into air but might result in increased noise levels and dust generation during surface clearing and stripping where bedrock is not exposed.
Water Act (No. 54 of 1956)	MAWLR: Department of Water Affairs : **Mr Franciskus Witbooi**	Makes provision for several functions pertaining to the management, control and use of water

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
Relevant Acts		
	(Deputy Director: Water Policy and Water Law Administration. Tel: (061) 208 7158	resources, water supply and the protection of water resources. **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 an existing borehole or surface water body onsite.**
Water Resources Management Act (Act No. 11 of 2013)		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). **Although no groundwater or surface water will be abstracted on site, potential spillage of hydrocarbons and the use of drilling fluids during exploration drilling has potential to pollute groundwater and any temporary surface water that may be present in streams. This is particularly crucial for the area concerned due to the drought-striken and low rainfall nature of the area.** 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
Nature Conservation Ordinance (Act	MEFT	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

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
Relevant Acts		
No. of 1996)		delete references to representative authorities; and to provide for matters incidental hereto. 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. For the removal of such species the proponent will have to apply for such a permit prior to commencing with the proposed activities.
Local Authorities Act No 23 of 1992	**Contact Person:** **Chief Zacharias Seibeb (Traditional Chief of the Daure Daman Traditional Authority)** **Contact Person: Iyambo Naruseb (chairperson of Otjimboyo Conservancy) and Senior Councillor Gerson Kuvare (Zeraeua Traditional Authority)**	The Daure Daman and Zeraeua Traditional Authorities are the responsible Local Authority of the affected project site area, and have been consulted and consent sought to ensure transparency and good working relationship between the project proponents and the traditional authorities.
Forestry Act (Act No. 12 of 2001)	MEFT: **Permits are required for the removal of protected plants species.** **For the project site area, the Proponent should contact Forestry Office (Ministry of Agriculture, Water and Land Reform)** **Mr Joseph Hailwa (Director: Forestry)** **Tel: (061) 208 7663** **OR** **Respective conservancies leadership:** **- Vannesa Goses (vice-chairperson of Tsiseb**	The Act provides for the management and use of forests and forest products. Section 22. (1) provides: "Unless otherwise authorised by this Act, or by a licence issued under subsection (3), no person shall on any land which is not part of a surveyed erven of a local authority area as defined in section 1 of the Local Authorities Act, 1992 (Act No. 23 of 1992) cut, destroy or remove - (a) vegetation which is on a sand dune or drifting sand or on a gully unless the cutting, destruction or removal is done for the purpose of stabilizing the sand or gully; or (b) any living tree, bush or shrub growing within 100 m of a river, stream or watercourse." Any endangered fauna shall equally be treated in a similar manner. The proponent will apply for the relevant permit under this Act if it becomes necessary.

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
Relevant Acts		
	Conservancy) and **- Iyambo Naruseb (chairperson of Otjimboyo Conservancy**	
Soil Conservation Act (Act No. 76 of 1969) And The Nature Conservation Amendment Act (Act no. 5) of 1996)	MAWLR	The Soil Conservation 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. The Nature Conservation Act makes provision for how communities perceive and value natural resources such as wildlife and plant species. Either Acts are applicable since stripping of topsoil and possibly surface clearing will take place to expose the targeted rock units. Mitigation measures are included in the EMP to preserve topsoil and reduce impacts on topsoil.
Regional Councils Act (Act No. 22 of 1992)	MURD	The Regional Councils Act legislates the establishment of Regional Councils that are responsible for the planning and coordination of regional policies and development. The main objective of this Act is to initiate, supervise, manage, and evaluate development at regional level. The relevant Regional Council for this project is the Erongo Regional Council which is an I&AP and has been engaged and provided with an opportunity to provide input on the proposed activities.

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
Relevant Acts		
Petroleum Products and Energy Act (No. 13 of 1990) Regulations (2001)	MME: Petroleum Affairs Division	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 without a designated license. **This law is applicable to this project because diesel will be stored on site for the duration of the exploration program to support the power generator and all mobile plant.**
The Road Traffic and Transport Act (No. 22 of 1999)	MWT: Roads Authority	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. **The law nonetheless applies to this project as all truck and plant operators/ drivers would need to be licensed. Additionally, the transportation of sample blocks to beneficiation factories will require that minimum load limits are adhered to.**
National Heritage Act (Act No. 27 of 2004)	MEAC	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. **The following sites of archaeological and heritage importance were identified during the**

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
Relevant Acts		
		assessment: - **Human caves and rock paintings in the southern part of the EPL (refer to Appendix E)** - **Homestead of the former Chief of the Daure Daman Traditional Authority, chief Thaniseb. (refer to Appendix E)** **However, should any other objects of heritage/ archaeological significance be identified after commencement of the project activities, the work must cease immediately in the affected sites and the necessary steps taken to seek authorization from the Council as outlined in the "chance find" procedures.**
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 he is in charge any nuisance or other condition liable to be injurious or dangerous to health. The proponent shall therefore ensure that all exploration machinery and activities are 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. Landowners such as farmhouses and settlements within close proximity shall be spoken to arrange working times when prospecting activities are to take place closer to their homesteads.
Labour Act, 2007	MLIEC	Sections 3, 4, 5, 11, 16, 23-27, 44 and 135 make provision for the following: • That a person may not employ a child under the age of 14years • That children are prohibited for employment in a mine and other dangerous

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
Relevant Acts		
		circumstances • That forced employment of persons is prohibited • That an employee is entitled to monetary remuneration daily, weekly, fortnightly, or monthly in cash, cheque, and direct deposit into a bank account • 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 • 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, • 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 month • 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 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 accompanying EMP.
Relevant Policies and Regulations		
Guidelines for Management of Conservancies and Standard	MEFT: Directorate of Parks and Wildlife Management	This guiding document provides a framework and standard operating procedures for the establishment and management of conservancies in Namibia, provides a coordinated effort and involvement of local community stakeholders in conservancy support, and fosters

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
Relevant Acts		
Operating Procedures of 2013		biodiversity conservation outside Protected Areas through the wise and sustainable use of natural resources and indigenous knowledge
Environmental Assessment Policy (1994)	MEFT: DEFA	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. **Please see Table 4 for a summary of the activities that would require authorization for the proposed prospecting of natural stone to produce dimension stone.**
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: • Employee's right to leave unsafe working places • Obligation of a mine manager to provide for all safety measures in a mine or quarry • Reporting of accidents to the chief inspector and keeping a record of such accidents • Requirements for the mine manager to provide occupational health services at area of mining activity • Requirements for stability of excavations; provision of waiting areas; provision of fencing and gates; schemes for working in vicinity of water body. • Provision for mine dump or mine tailings facility • Ensuring that all parts of a mine are well ventilated with minimum standards of air quality • The mine manager's responsibility to formulate a scheme for safe movement of vehicles being use in the mine/ quarry • The mine manager's responsibility to formulate a scheme for identifying hazards at the

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	IMPLICATION ON THIS PROJECT
Relevant Acts		
		area of mining activity and provision of appropriate protective equipment • Ensure that the mine manager provides first aid and firefighting equipment and procedures where exploration/ quarrying activities are being conducted All the above-mentioned provisions are relevant to this project and were thus considered in the ESA process and EMP.
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	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. This Ordinance is relevant to the project under review as potentially toxic substances such as drilling fluids will be utilized during various stages of the proposed project.

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 units at depth
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 drilling and test quarrying activities, both of which require environmental clearance 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, and possibly bulk excavation in spatially confined spots to extract sizable blocks.
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^3 (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

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 and destruction of biodiversity habitats
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 covered by EPL 6217 through a holistic analysis of baseline data and information as deduced from field assessments (e.g. transect walks to identify, record and describe the various flora and fauna species observed), literature review and consultation with the indigenous communities and local authorities to verify the data that was collected remotely. This provided a baseline against which changes that would likely arise as a result of the proposed project can be measured and monitored through time.

5.1 Current Biophysical Environment

5.1.1 Climatic Conditions

As shown in earlier chapters EPL 6217 overlies two communal conservancy areas, namely the Tsiseb and Otjimboyo Conservancies. This area as per the rest of Namibia, falls within the Subtropical High Pressure Zone, characterised by massive dry air, low rainfall and predominantly high temperatures (Mendelsohn *et al*., 2009). No weather related stations exist within the boundaries of the EPL but data sourced from reliable climate related sources such as Meteoblue (https://www.meteoblue.com/en/weather/webmap/beta/uis_namibia) and Mendelsohn *et al* (2009) for the Uis area suggest the following patterns:

- In summer average temperatures can reach up to +/- 35˚C
- In winter average minimum temperatures range between 10-18°C
- The winter months, June to August are generally are rainless
- Limited rainfall is more frequent in January to March with occasional rain experienced between September and December, and annual average rainfall between 100-150mm
- Daily sunshine hours are typically between 10 and 11 hours
- Winds are predominantly in a north easterly and south westerly direction, with average speeds ranging between 2 and about 10 km/hr

5.1.2 Ecology - Fauna and Flora

An ecological sensitivity map of the site was produced by integrating the information collected on-site with the available ecological and biodiversity information in the literature and various spatial databases. This includes delineating the different vegetation and habitat units identified in the field and assigning sensitivity values to the units based on their ecological properties, values and the potential presence of species of conservation

concern. Details of these are provided in the attached Ecological/ Biodiversity specialist study (**Appendix D**).

5.1.2.1 Flora

In general, the area is part of Namibia's Central West eco-region, and the area is largely characterized by a low mean annual rainfall. As such the dominant vegetation in the area is that which is capable of surviving in harsh temperature and low water environments (**Appendix D**). The most dominant species in the project area are *Parkinsonia africana*, *Commiphora glaucescens, Euphorbia damarana* and *Euphorbia virosa* (Figure 5-1).

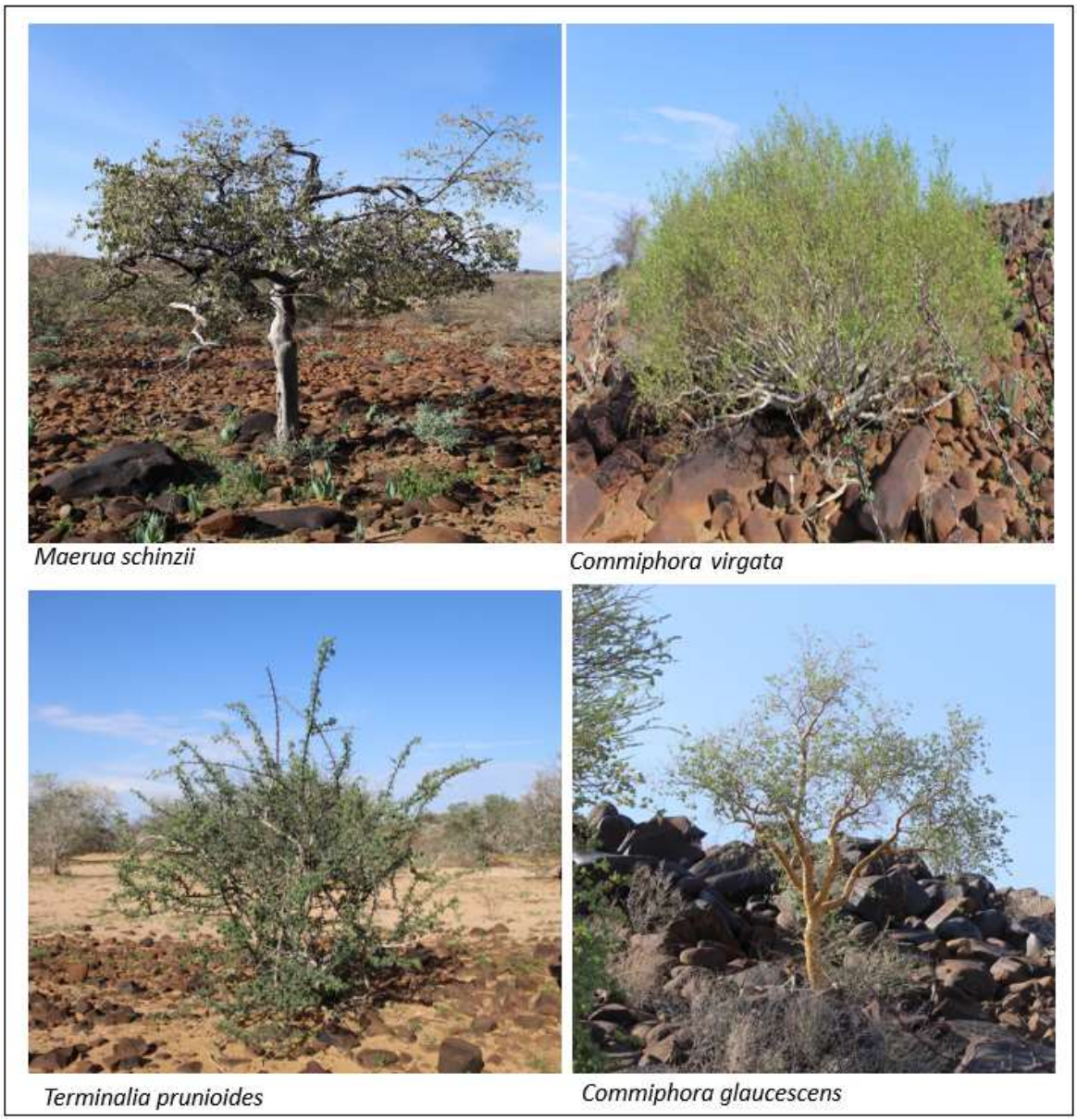

Figure 5-1. Selected species found in the project area

Moringa ovalifolia is the species which is widespread and locally common in some of the mountaneous areas targeted for drilling and test quarrying (Figure 5-2). It is, however, protected by a Nature Conservation Ordinance in Namibia.

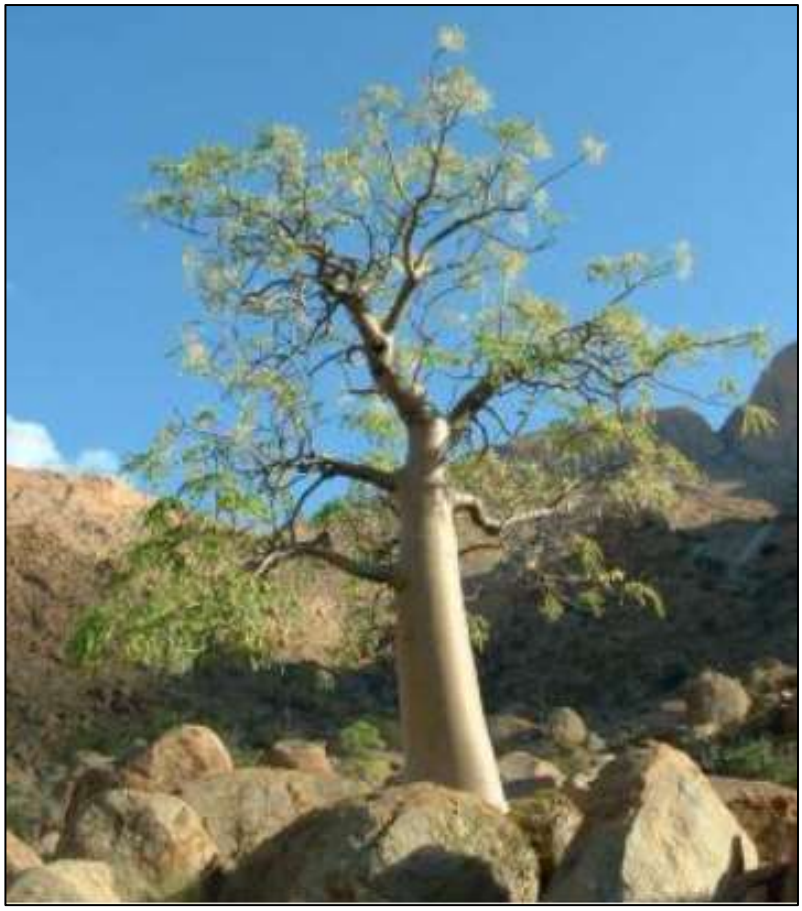

Figure 5-2. Protected tree species - *Moringa ovalifolia*

5.1.2.2 Fauna

Based on site observations, animal life in the area seems to be very scarse, particularly when it comes to mammals. Based on literature and verbal communication with community members the dominant wildlife sporadically spotted in the area are summarized in Table 5-1. There is also evidence of small stock (sheep and goats) which is being farmed at a subsistence level, but most farmers claim that large numbers of their heads have succubed to drought over the last 3 to 5 years.

Table 5-1. Mammals sporadically spotted in the study area

Scientific name	Common name
Antidorcas marsupialis	Springbok
Oryx gazella	Gemsbok/Oryx
Struthio camelus	Ostrich
Capra aegagrus hircus	Goats
Ovis aries	Sheep

Because of the diversity of habitats, including deeply incised valleys of tributaries, bushland, grassland and mounteneous terrain, the site has a high diversity of bird life (**Appendix D**).

5.1.3 Geology and Soils

The EPL area is almost entirely underlain by basement rocks belonging to the Southern Kaoko Zone, particularly the Amis Formation of the Zerrissene Group. These basement rocks have been intruded by thick plutons of the red/ pinkish younger Salem Granite Suite and later by thick dykes of fine to medium-grained dolerite (refer to Figure 5-3). These two rock units are the primary targets for dimension stone exploration. The granites are generally medium to coarse-grained with a porphyritic texture, and mainly occur as isolated blobs in the south to south western areas of the EPL and dominate large portions of the flat terrain in the central part of the EPL. Based on field observations, these granites are either largely exposed on the surface or covered by a thin poorly developed layer of sandy gravels as shown in Figure 5-4**.** This rock unit is host to a number of semi-precious minerals such as tourmaline, rose quartz, and aquamarine which are exploited by small-scale miners in the area, particularly in the Otjimboyo side of the EPL. On the other hand, the dolerete dykes tend to occur as isolated elongated patches in the south western and north eastern portions of the EPL, and topographically form higher relief koppies of black stones covered by abundant boulders and little to no soil (refer to Figure 5-5**)**.

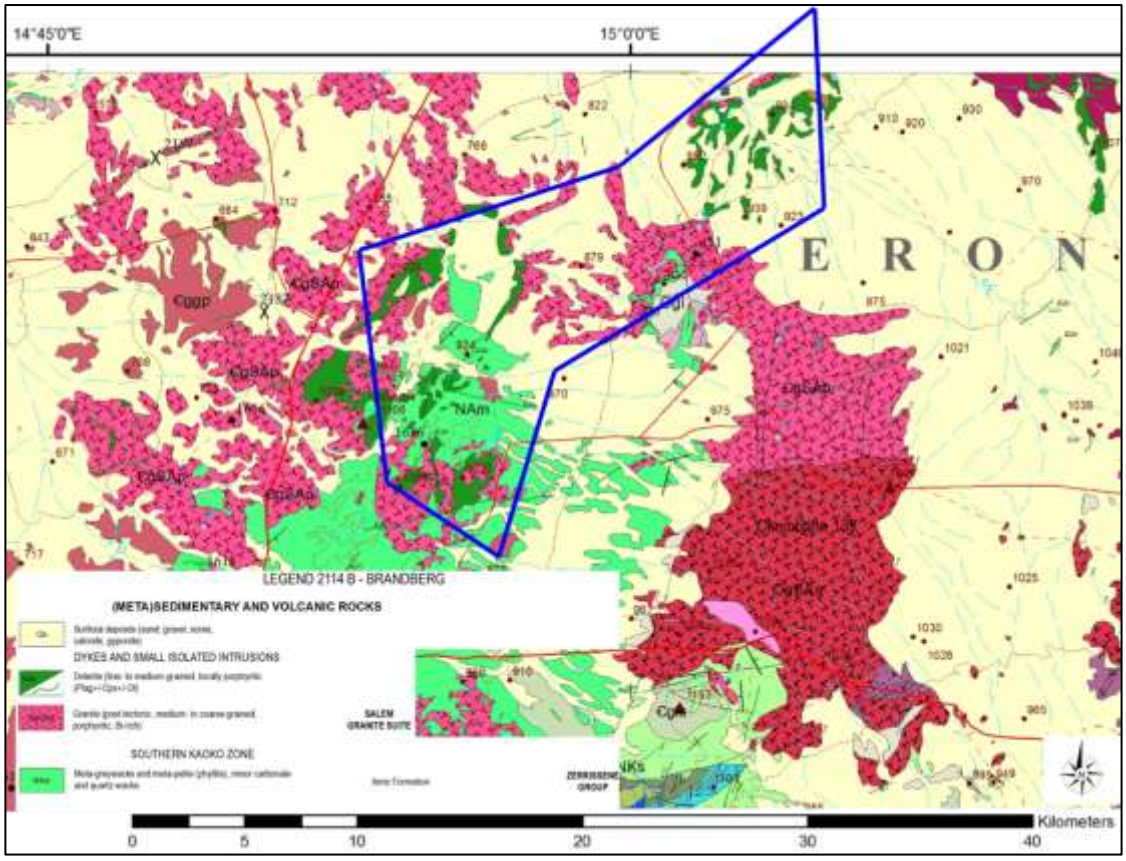

Figure 5-3. Extract of the Geological Map of the project area from the 1:250 000 Geological Map (Map sheet 2114B Brandberg)

Figure 5-4. Exposed and shallowly covered red/ pinkish granite bedrock observed across the project area

Figure 5-5. Typical dolerite dykes forming koppies of black stones across the project area

The site is characterized by very shallow and poorly developed sandy gravel soil, and therefore holds very little water due to its high permeability. Only hardy plant species grow in this Lithic Leptosols due to their low water holding capacity. This soil type has a solid layer at a shallow depth that remains hard even when wet. Leptosols are also known to have very low soil fertility and therefore only the hardiest plant species will grow on them (Mendelsohn *et al.*, 2009).

5.1.4 Additional physical, social and economic elements of the receiving environment

A summary of additional bio-physical and social elements of the receiving environment are presented in **Table 5-2** and **Figure 5-6** below.

Table 5-2. Biophysical and socio-economic elements of the receiving environment

SUMMARY OF BASELINE ENVIRONMENT			
PHYSICAL ENVIRONMENT		**SOCIO-ECONOMIC ENVIRONMENT**	
Topography	The area concerned is generally characterized by distinct isolated hills of dolerite and granite in the north-eastern and south-western corner which are surrounded by largely flat grassland with scattered shrubs and bushes. The flat	Land Use	The entire EPL lies on communal land which is partly being used as a settlement with limited subsistence farming of small stock (mainly goats). The area is also registered as a communal conservancy initially aimed at conserving

	terrain between the hills comprises a thick succession of fine gravelly sand and provide good access to the license area		some wildlife such as gemsbok and springbok, but due to illegal hunting activities coupled with drought, uncontrolled small-scale mining activities and limited capacity to understand tourism the conservation of such wildlife on farm Nudanab and the Otjimboyo area has been limited. Most of the conservation by the Tsiseb Conservancy is presently concentrated around the Brandberg Mountains where various enterprises exist in the form of joint venture trophy hunting, joint venture lodge, Daured Craft Center, Coffee Shop and Daureb Mountain Guides (Jansen, 2016). Conversely, the Otjimboyo Conservancy is also gearing towards increased tourism

			activities through the proposed establishment of the Elephant Ridge Camp. Apart from the limited conservation within the EPL's footprint, substantial evidence of small scale mining activities for semi-precious stones such as tourmaline, aquamarine and rose quartz exists in the lower lying granite dominated areas, especially in the Otjimboyo area. Such evidence is manifested in the form of isolated laterally extensive hand-dug and TLB excavated trenches through the granite rock unit. Because of the uncontrolled nature of these excavations, some of the abandoned trenches have turned into extensive erosional gullies, which according to locals pose a

			significant threat to livestock in the area
Surface Drainage & Groundwater	The site is largely characterized by frequent small, shallow and dry surface streams that show no evidence of water flow in recent times. One old borehole located adjacent to the Old chief's home currently provides water for domestic use on farm Nudanab but farmers claim that the water is salty and hard. Accordingly, water is usually carted from namwater lines in nearby towns such as Uis and Omaruru	Land Ownership	Half of the license area falls under the Dauren Daman Traditional Authority and the other half falls under the Omihana Traditional Authority
		Demography, Population Density & Distribution	The area is characterized by a low to medium population density (of about 1 family or homestead per km^2 of land), with majority of the people living (on a full-time basis) on these farms being pensioners while the younger population lives in Uis and

			Omaruru, and provide domestic and financial support to the pensioners living on the farms. In relative terms the Omihana portion of the license however appears to have a higher population and a generally younger population. More small stock farming was also observed in the Omihana area
		Economic activities	Unemployment on farms Nudanab and Otjomboyo area are extremely high according to residents. Majority of young people from the study area make a living elsewhere in places like Uis and Omaruru. Some small scale miners make a living from quarrying semi-precious stones but this has largely declined due to the prevailing shortfall of tourists as a result of the covid-19 pandemic.

		Infrastructure & Services (roads, power, water, sewage, recreational facilities, water infrastructure)	The main gravel road (C35) between Uis and Khorihax borders the EPL to the west. In addition, the EPL area is accessible via the D3714 to Otjimboyo. Several small access track roads cross the license area. Communal water boreholes were observed both on Farm Nudanab as well as in Otjimboyo, and these were noted to contain slightly saline water. No other major infrastructure such as powerlines or telecommunication lines or water pipelines were observed in the area.

Figure 5-6. General landscape, shallow narrow dry surface streams, and existing access roads observed in the proposed project area

5.1.5 Archaeological and Heritage Sites

A field survey and desktop background assessment of archaeological, cultural heritage, and historic aspetcs of the study area found the following sites of archaeological, cultural, and historical significance:

- Rock paintings in one of the riverbeds in the southern portion of the EPL. The paintings are hosted in a the meta grewacke and quartz wacke rocks of the Southern Kaoko Zone, which are not one of the targeted rock units for dimension stone
- The homestead of the late chief of the Daure Daman Traditional Authority, late Chief Taniseb. This is located at the toe of one of the main dolreite instrusive bodies, just west of the community borehole on Farm Nudanab.
- An old grave located at the toe of one of the dolerite bodies located east of the Otjimboyo conservancy office.

These are the known sites as at the time of this assessment, and were primarily identified with the aid of indigeneous knowledge from local elders and community members. At the time of compiling this report no other sites, burial grounds or isolated artefacts were known in within the EPL area but could be present in the area. Key findings of the archaeological/ heritage study undertaken are documented in detail under **Appendix E**, attached.

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 communities 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 concerned communities.

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 and expanded. A complete list of the I&APs identified and registered for the project can be found in **Appendix F**. The pre-identified I&APs were initially informed via email, SMS and radio communication through both Traditional Authorities about the ESA process, the first public consultation meeting to be held on Farm Nudanab on 20th February 2021, and the period for launching concerns/ objections/ inputs ending on the 5th of March 2021. During the first one-on-one public consultation meeting held on 20h February 2021 on Farm Nudanab, more I&APs were registered and these individuals were thus included in all communications concerning the project from that point onwards.

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, Ats & Culture)

- **Regional government:** Erongo Regional Council (head office, constituency & district level offices)
- **Local authority**: Arandis Constituency Office, Daures Constituency Office; Karibib Constituency Office; Uis Town Council; Daure Daman Traditional Authority; Omihana/ Otjimboyo Traditional Authority, Ohungu Communal Conservancy, Otjimboyo Communal Conservancy, Tsiseb Communal Conservancy
- **Government Parastatals**: Namwater (environmental section), Roads Authority (Legal & Road Network Planning Section), Erongo Red, National Heritage Council, Namibian Chamber of Mines, National Botanical Research Institute, Nampower
- **Members of the public including land/farm residents, concerned lobby groups:** As attached in Appendix F

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 initially compiled with the assistance of the Dauren Daman and Omihana Traditional Authorities. This initial list of I&APs included representatives from central, regional and local government institutions (ministries, regional and local authorities) as well as representatives from relevant government parastatals, non-governmental organisations (NGOs) such as the Botanical Institute of Namibia, the concerned communal conservancies, and some residents from the affected communities.
- An email was circulated to all identified and registered I&APs on the 9th of February 2021 announcing the commencement of the EA process and extending a formal invitation to register as an I&AP as well as to attend the one-on-one public consultation meeting which was scheduled for 20th February 2021 on Farm Nudanam. Included in this email was the Background Information Document (BID) which provided a high-level description of the proposed activities and the whole procedure to be followed for the Environmental Assessment. A copy of this email trait is attached in **Appendix G**.
- Formal public notices announcing the commencement of the EA process and an invitation to register as I&APs as well as to attend the public consultation meeting scheduled for 20th February 2021 on Farm Nudanam were placed in *Die Republikein, The Sun Newspaper* and *Allgemeine Zeitung* newspapers (dated 29 January 2021 and 11th February 2021, please refer to **Appendix G,** attached).

- Printed formal site notices were placed at strategic places to help inform the general public about the project and scheduled meeting on 20th February 2021. Places where such site notices were placed included the regional council office in Swakopmund, the Daures Constituency Office, the Tsiseb conservancy office, Uis Town Council, and entrance to key supermarkets in the location. Please refer to **Appendix G** for a record of these notices.
- The BID was further circulated on request via email to I&APs throughout the scoping process.

6.2.1 Consultation/Public Meetings

A total of four public and community engagement meetings were at Uis, Farm Nudanab and Otjimboyo to provide the affected communities with ample opportunity to provide inputs and express their views on the proposed prospecting activities. These meetings were held as follows and the deliberations are briefly documented below:

- The first meeting was held on 20th February 2021 on Farm Nudanab, and was attended by representatives of both traditional authorities, representatives of the Tsiseb and Otjimboyo communal conservancies, JTD Mining personnel, residents from farm Nudanab and Otjimboyo area, as well as some residents from Uis. This meeting was attended by about 27 people. After OMAVI and JTD Mining's presentation to the attendees, the community of Farm Nudanab generally felt that a second consultation meeting needed to be held to ensure a bigger and more representative attendance of the general Nudanab community. Ultimately, a second series of consultation meetings with the Nudanab community was agreed upon for the 20th af March 2021. The first of these meetings took place on Farm Nudanab, and included the broader public from Uis and surrounds, residents of Farm Nudanab, representatives of the Daure Daman Traditional Authority, the Tsiseb communal conservancy, relevant constituency offices, JTD Mining representatives and other I&APs. This meeting proceeded from 08h30 to 12h30 and had a total attendance of 28 people. The residents of Farm Nudanab further requested a separate and more focussed group meeting with representatives from OMAVI and JTD Mining to discuss issues which they deemed pertinent but were not necessarily concerned with non-residents of Farm Nudanab. This meeting was held at the Uis Youth Centre on the same day between 19h00 and 20h30, and was primarily attended by members of the Taniseb family, namely Rolinda Tanises, Annethe Tanises, Ebison Gariseb, Mrs. A. Dausas, Fridrik Ama-Goab, Aven Goagoseb and Zebo Gaseb.

- On the afternoon of 20th March 2021 at 14h00 another public consultation meeting was held in Otjimboyo for all communities falling under the Zeraeua Traditional Authority. This meeting had a total attendance of 83 participants; with representatives from Otjimboyo, Omungambu, Otuyapi, Otjihinameva and Omihana.
- The attendance registers, photographs, as well as a summary of key issues and opinions raised at these meetings are included in **Appendix H** and **Appendix I.**

6.2.2 Public Site Notices

As part of efforts to ensure public awareness of the consultation meetings held and the project in general, site notices informing the general public as well as affected land owners about the Environmental Assessment process, and providing details of the scheduled consultation meetings were placed at the following strategic locations as shown in **Figure 6-1**:

- The Tsiseb and Otjimboyo Communal Conservancy offices
- Daure Daman Traditional Authority office
- Uis Settlement Office
- Erongo Regional Council
- Prominent local cuca shops at Otjimboyo village and
- Prominent supermarkets in Uis (e.g. Multi-Save)

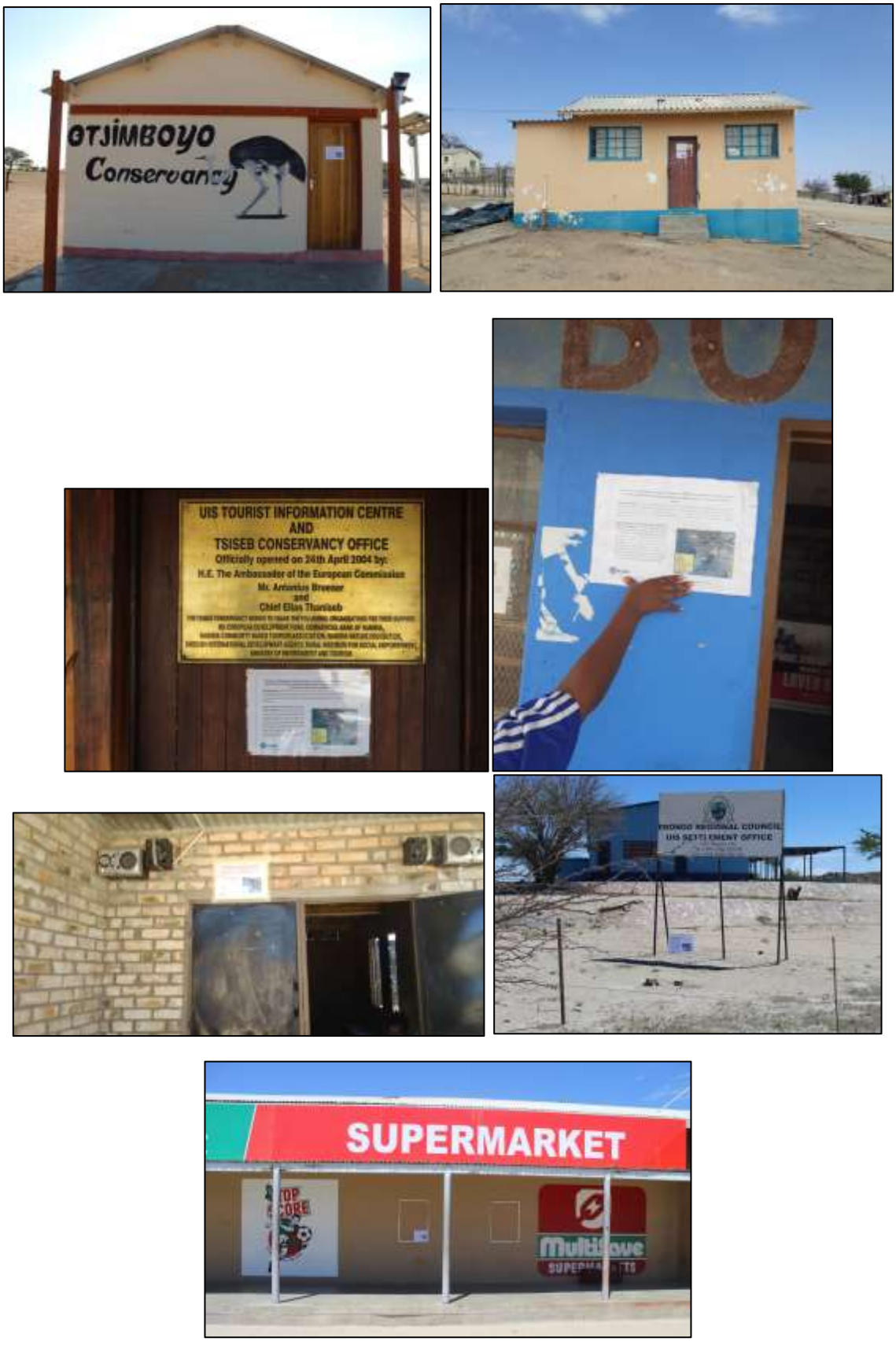

Figure 6-1. Notices placed at various strategic locations accessible to the general public

6.3 Consultation Feedback: Issues, Concerns & Suggestions Raised

The key issues raised during the public participation process (PPP), through both one-on-one engagement meetings as well as through other communication platforms such as emails are summarised in **Table 6-1** below. All comments, concerns, issues, and feedback regarding significant issues received from I&APs (including authorities) have been summarised in **Appendix I**, and were thoroughly responded to, clarified and addressed as part of the impact assessment under Chapter 7.

Table 6-1. Key issues raised during the public participation process

CATEGORY	ISSUE RAISED	RESPONSE OR RECOMMENDED MEASURE
Rehabilitation	There are concerns around ensuring that any excavations to be created during prospecting may not be rehabilitated, thereby leaving the biophysical environment in a degraded state. There are also concerns that if such excavations are not fenced off or backfilled, they pose a threat to livestock and wildlife	
Benefits to affected communities	The question of what benefits can be guaranteed from the project in the long run repeatedly came up	JTD Mining personnel acknowledged the following potential benefits: • Rehabilitation of the community borehole on farm Nudanab during the prospecting phase • If prospecting is successful and project proceeds to mining phase the following benefits can be realized: - Employment of at least 200 people during construction and operation of a stone processing factory between Otjimboyo and Tsiseb areas. Such a factory will likely be powered by a local 24MW solar plant, hence the community could benefit from the setting up of a solar power plant

		- Surface lease fees to the affected traditional authorities - Procurement opportunities to local SMEs such provision of security services, carting of water, transportation of blocks to harbour
Mobilization of equipment to Farm Nudanab prior to granting of ECC	Members of the community are concerned that since an exploration camp site has been set up at site exploration might commence prior to granting of the ECC	JTD Mining personnel and Chief Seibeb both assured the community at the two meetings held on Farm Nudanab that no prospecting activities will take place prior to granting of the ECC
Nuisance of residents from noise and movement of machinery	Noise near homesteads	Not intrusive prospecting activities (e.g. drilling or cutting of sample blocks) will take place within a 250 m radius of occupied homesteads. No intrusive activities will take place before 06h00 in the morning or after 19h00.
Concerns around preserving known heritage sites	There are concerns around preserving known heritage sites such as late Chief Taniseb's homestead, the rock paints and human caves marked in the archaeological report, as well as old graves in the Otjimboyo area (also marked in the archaeological reports)	JTD Mining personnel agreed that they will maintain a buffer distance of at least 300 to 400m from known heritage sites. Additionally, they will employ spotters with indigenous knowledge to help spot suspect sites. Any sites found by chance will immediately be reported to the National Heritage Council

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

The draft ESA and EMP Reports were circulated to registered interested and affected parties on 22nd April 2021 via electronic mail for a 7-day review period, prior to finalizing the reports and submitting onto the MEFT's online portal on 08 January 2021. Hard copies of the final reports were also submitted to the Tsiseb and Otjimboyo Communal Conservancy offices for their archives, and for anyone who may be interested to make copies of these documents for their record keeping.

The significant potential impacts and issues raised which could affect the biophysical and socio-economic environment of the project site and surrounding areas are described and assessed in the next chapter. The mitigation measures are also briefly highlighted under the respective potential impacts in the same chapter. More details pertaining to the proposed mitigation or management measures for various potential impacts are contained in the accompanying EMP.

7 IMPACT IDENTIFICATION AND ASSESSMENT

The purpose of this section is to identify significant adverse impacts and issues of concern, as well as those that need to be enhanced, and ultimately device pragmatic management and mitigation measures to minimise risk levels associated with different adverse impacts identified while enhancing the potential value proposition from the positive impacts. The various potential impacts were identified using a broad-based transparent and inclusive approach tapping from research, as well as from scientific (intellectual) and indigenous knowledge and experience of the EAP and I&APs. Accordingly, the impacts documented herein include those identified by the independent EAP as well as those triggered by concerns and issues raised by I&APs who actively participated in various communication platforms as part of the public participation process.

The potential impacts identified were then evaluated, in a systematic manner, to permit the risk ranking of each impact. Feasible mitigation and enhancement measures were subsequently developed, taking into account site specific conditions. Comments and concerns raised during the public consultation process, which partly informed the impact identification process, are documented in detail in **Appendix I and J**.

The following potential impacts have been identified:

Potential Positive Impacts:

The proposed project has the potential to employ approximately 10 -15 local personnel on a full-time basis, which could improve livelihoods and make a positive contribution towards unemployment reduction and skill acquisition of youth in the areas of Uis and Otjimboyo through the transfer of certain skills, such as the operation and maintenance of earthmoving and stone cutting machinery. At sites where prospecting results are unsuccessful rehabilitation will be implemented to close up any open excavations, spread topsoil over such working areas and remove any foreign objects from such sites once they have been backfilled. This will require field-based and logistical support.

During the rehabilitation phase, opportunities for casual employment are likely to increase as the number of unskilled workers will likely increase to assist with this kind of work. Additionally, on the upside the project will, in the long run, guarantee the supply of durable and good quality dimension stone blocks to local stone processing factories in Karibib and Walvis Bay whilst a new basic facility for stone cutting is being developed in the area to supplement the planned quarrying activities if exploration yields successful results. The potential development of a fully-fledged stone cutting factory in the area to supplement quarrying operations in the long run is further expected to introduce a new wave of employment and procurement opportunities for local residents if prospecting yields positive results, and provided that a conducive working relationship is development and maintained between the affected communities and JTD Mining.

Other potential positive impacts include: operating levies and surface rental fees payable to local authorities and the directly affected landowners; potential revenue collection by the national road agency through fees charged on loaded trucks; and potential new business opportunities for local businesses such as the provision of accommodation, security services, mechanical services, water carting services, fencing, and sample block haulage. Lastly, it is anticipated that JTD Mining Group will partially offer assistance to small scale miners in the area through the hiring of some of their earth moving plant at subsidized rates during periods of low equipment utilization.

Potential Negative Impacts per Primary Activity:

Quarrying:

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

PRIMARY ACTIVITY - MOBILIZATION & SITE SET UP	
Activity/ Hazard	**Potential Impact**
Surface clearing of vegetation and creation of elevated platforms over the footprints of support infrastructure such as the exploration	• Potential destruction of natural vegetation and habitats at the affected sites due to surface clearing, illegal firewood collection • Potential disturbance and threats to livestock and wildlife due to illegal hunting and possible poaching • Potential disturbance and alteration of soil structure due to construction and traffic compaction, resulting in increased runoff coefficients and

camp at Farm Nudanab; creation of access small access roads to facilitate mobilization; and general mobilization plus site set up	possible increase in erosion susceptibility • Potential injuries and fatalities of livestock and wildlife from potential collisions with moving light and heavy vehicles during mobilization of various equipment to site • Potential noise pollution from earthmoving machinery • Potential visual impacts at night from lighting at the exploration camp since conditions are normally dark in these rural areas • Solid waste pollution due to littering and poor storage of domestic and industrial (scrap metals, oils, empty containers, used tyres) waste at the exploration camp • Possible pollution of surface water resources due to inadequate and inappropriate sanitation facilities
PRIMARY ACTIVITY - STRIPPING AND CUTTING OF SAMPLE BLOCKS	
	• Potential generation of solid waste in the form of waste rock dumps, especially adjacent to dolerite hills where a significant amount of loose boulders would need to be stripped to access solid bedrock. In such areas there is a high risk of mixing the topsoil with boulders, which may compromise the effectiveness of rehabilitation. Additionally, permanent changes to the topography and landscape may occur as a result of this • Potential generation of dust from increased vehicular flow on site and

Surface clearing of vegetation and stripping at selected sites where exploration drilling and the cutting of sample blocks is to take place	from cutting operations to extract sample blocks • Potential destruction of sensitive flora at the affected sites, especially on the mountains • Potential fragmentation of bird life due to stress induced by noise from foreign objects and machinery such as drilling and stone cutting machines • Removal of sample blocks from spatially constrained site will leave open holes and possibly exposed steep rock faces at the affected sites which may pose trip and fall hazards to humans, livestock and wildlife in the area if they are not backfilled immediately or clearly demarcated. • Introduction of harmful substances such as drilling fluids may contaminate surface and ground water during runoff and seepage if not properly managed. Such substances may further harm the environment through direct ingestion by plant roots and indirect consumption when animals and humans feed on contaminated plants, animals and water. • Possible soil contamination from hydrocarbon spillages • There are occupational Safety and Health risks to workers and the general public posed by increased potential noise and dust pollution from movement of traffic in the area. • Potential slope failures of waste rock dumps after heavy rains due to

	reduced shear • Potential disturbance and damage to unforeseen archaeological or heritage sites during drilling and test cutting operations.
Storage of new drilling fluids, oil drums and new/ recycled hydraulic oils on site	• Risk of soil contamination from unintended spillages • General pollution and deterioration of the sites due to the presence and storage of such foreign objects
Loading and hauling of sample blocks to the stone processing factories in Karibib or Walvis Bay	• Possible collisions between moving plant and personnel and animals • Potential generation of noise and dust as trucks will be moving in and out of the area throughout the exploration phase. Excess dust generation comes with the added effect of impaired visibility • Possible fuel spills from trucks if breakdowns occur and unexpected hydraulic pipe bursts occur • Potential accidents arising from poor access road conditions • Lifting operations during loading and unloading of sample blocks can pose occupational safety hazard • Potential damage to road infrastructure if trucks are overloaded
PRIMARY ACTIVITY - DECOMMISSIONING AND REHABILITATION AT UNSSUCESSFUL SITES	
Backfilling of open excavations, spread topsoil over such areas and shape such sites to align with natural or surrounding landscape; rip upper 0.5m of soil and close off access roads to sites where test quarrying is unsuccessful; excavate contaminated soils and dispose off at designated waste sites in	• Potential generation of dust and noise from earthmoving machinery • Alterations of the natural landscape and topography

Uis	
Fencing off and preservation of excavations at sites where exploration results are positive, and quarrying is likely to take place. This will be done to preserve the sites while a mining license is being obtained	• Inhibited free movement of fauna due to fencing • Attraction of illegal and unsafe small scale mining where excavations are left open

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

7.1.1 Impact Assessment Screening

The potential impacts identified by the Environmental Assessment Practitioner, based on both professional experience as well as feedback from consultations with the Interested and Affected Parties (I&APs), were screened through a set of questions (presented in **Figure 7-1**) to help make an informed judgement as to which impacts would require further and more detailed assessment.

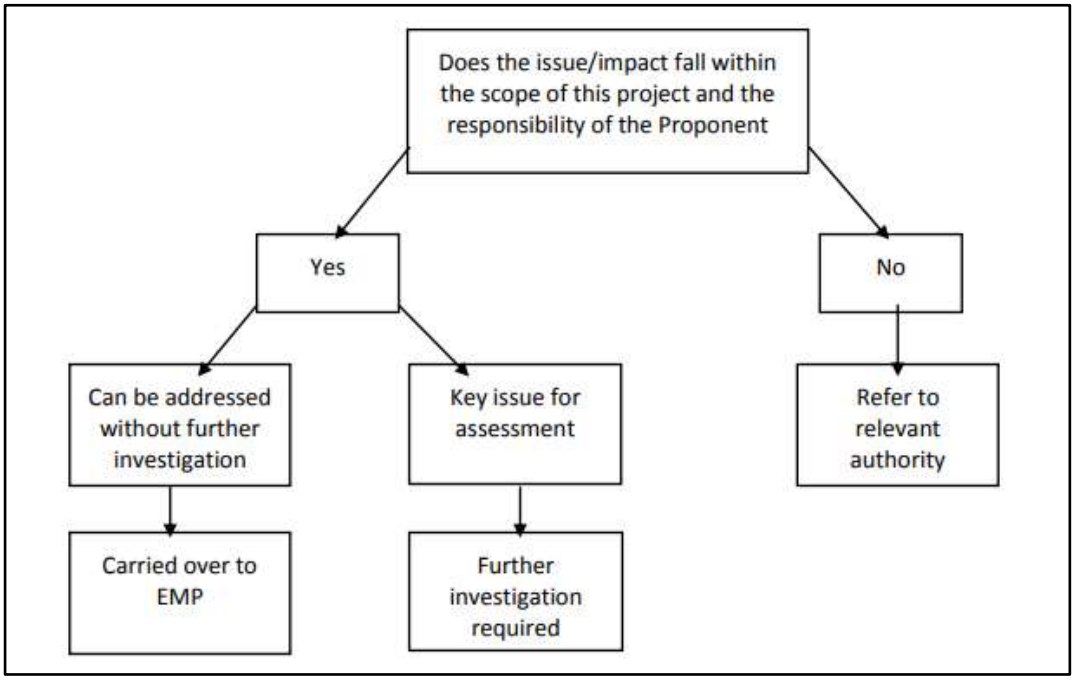

Figure 7-1. Screening process for determining key impacts

7.2 Impact Assessment Methodology

The proposed and partially implemented prospecting activities have been characterized as sources of impacts on the natural, floral, faunal, socio-economic, cultural, function and use values and components of the receiving environment. To evaluate the potential extent of the potential impacts, a systematic methodology was adopted to define the status, geographical extent, duration, intensity, severity (consequence), likelihood of occurrence, and significance (or risk level) of the impacts identified. The impact evaluation stage is a key component of the Environmental Assessment process because it brings together project – specific characteristics/ activities and the changes to the receiving environment which would likely stem from the proposed activities. The impact assessment methodology considered all stages of the project's life cycle and the various scales used are summarised in **Table 7-2, Table 7-3** and **Table 7-4** below.

Table 7-2. Methodology adopted for evaluation of potential impacts

Risk Event	Brief description of the activity/ hazard introducing the impact.
Status of impact (+ or -)	*This refers to whether the induced change will contribute positively or negatively to the affected environment* **Positive** - environment overall will benefit from the impact **Negative** - environment overall will be adversely affected by the impact **Neutral** - environment overall will not be affected or altered
Impact Classification	*Is the impact concerned with:* • *SAFETY of workers, local community and general public* • *HEALTH of workers, local community and general public* • *ENVIRONMENTAL* • *IMAGE, REPUTATION or COMMUNITY RELATIONSHIPS* • *LEGAL REGULATIONS AND STANDARDS* • *FINANCIAL DAMAGE OR LOSS*
Spatial Extent of impact	*This refers to the geographical extent of the induced change* **Site specific –** limited to the directly affected site **Local** - limited to a radius of 15 km **Regional** - limited to 15 to 100 km radius **National** - limited to within the borders of Namibia **International** - extending beyond Namibia's borders
Duration of impact	*This refers to the time period over which the impact is expected to last* **Very Short**-lived (<3 days) **Short-lived** (3 days – 1 month) **Medium-term** (beyond 1 month to 5 years) **Long-term** (between 5 and 20 years) **Permanent** (>20 years)

Intensity of impact	**No lasting effect** - No environmental functions and processes are affected **Minor effects** - The environment functions, but in a modified manner **Moderate effects** - Environmental functions and processes are altered to such extent that they temporarily cease **Serious effects** - where environmental functions and processes are altered such that they permanently cease and/or exceed legal standards/requirements
Significance/ Risk Level (without controls or mitigation)	*The significance/ risk level of an impact is evaluated based on its classificationas per the scale below (refer also to Table 7-3):* **Negligible (Level 1)** **Minor (Level 2)** - the impact is not expected to require amendment to the project design. **Moderate (Level 3)** - the impact is expected to require modification of the project design or alternative controls. **Major (Level 4)** - the impact could have a 'no go' implication for the project unless mitigation or re-design is practically achievable **Catastrophic (Level 5)** - the impact will have 'no go' implications for the project
Proposed controls / Mitigation	Description of practical mitigation and/ or management measures
Significance/ Risk Level (with controls or mitigation)	*The significance/ risk level of an impact is evaluated based on its classificationas per the scale below (refer also to Table 7-3):* **Negligible (Level 1)** **Minor (Level 2)** - the impact is not expected to require amendment to the project design. **Moderate (Level 3)** - the impact is expected to require modification of the project design or alternative controls. **Major (Level 4)** - the impact could have a 'no go' implication for the project unless mitigation or re-design is practically achievable **Catastrophic (Level 5)** - the impact will have 'no go' implications for the project
Confidence Level	The degree of confidence in the predictions, based on the availability of data/ information and specialist knowledge. **Low** - would indicate that further investigation is required if the impact could potentially be significant **Medium** - further investigation may be required if the impact could be significant **High** - 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

Table 7-3. Impact consequence and likelihood scale

CONSEQUENCE RATING	CONSEQUENCE / SEVERITY						LIKELIHOOD					
							Consequence may occur under exceptional circumstances	Consequence could occur at some time	Consequence should occur at some time	Consequence will probably occur in most circumstances	Consequence expected to occur in most circumstances	
							Conceivable, but very unlikely (has not happened yet)	Has never been known to occur in the business/ area, but has happened somewhere and is highly unlikely that it will happen within 20 years.	Has happened in the business/ area at some time and could happen within 10 years	Meduim occurrence happens infrequently - Occurs in order of less than once per year and is likely to reoccur within 5 year	High occurrence happens frequently - Occurs in order of one or more times per year.	
	SAFETY (INJURY) (Includes workers, local community and general public)	**HEALTH (DISEASES) (Includes workers, local community and general public)**	**ENVIRONMENT (Landscape, Topography, Fauna, Flora, Soils, Air Quality, Visual, Water Resources, Archaeology)**	**IMAGE & REPUTATION / COMMUNITY RELATIONSHIPS**	**LEGAL**	**FINANCIAL IMPACT**	**1 (RARE - practically impossible)**		**2 (UNLIKELY – not likely to happen)**	**3 (POSSIBLE to happen)**	**4 (LIKELY to happen at some point)**	**5 (ALMOST certain to happen)**
LEVEL 5 CATASTROPHIC	Multi Fatalities	Permanent disability with potentially lethal effects - effects form	Disastrous impact on the environment. Irreversible effects to flora and fauna (e.g. total destruction	Negative media coverage at internal level / Loss of multiple major	Major litigation / prosecution at corporate level /	Property damage > N$ 100 Million Production loss > N$ 100	**5**	**Moderate**	**High**	**High**	**High**	**High**

		exposure may cause death to one or more persons.	of wetlands, pans, sensitive landscapes, soils, water resources, and etc).	customer or large proportion of sales contracts / Loss of community support / Significant negative impact on the share price	Nationalisation / loss of licence to operate	Million						
LEVEL 4 MAJOR	Single fatality or permanent disabilities (such as loss of limb, sight loss or severe disability to body functions)	Permanent non-lethal effects. Permanent effects - loss of quality of life, but not life threatening.	Severe impact on the environment. Reversible effects to flora and fauna with long term damage (1-10 years) to widespread area of significance (e.g. partly destruction of wetlands, pans, sensitive landscapes, visual and etc)	Negative media coverage at national level / Scrunity from government and NGO's / Complaints from multiple "final" customers / Loss of major customer / Loss of community support / Negative impact on share price	Major litigation or prosecution at Division level	Property damage between N$ 2 Million - N$ 100 Million Production loss between N$ 2 Million - N$ 100 Million	**4**	**Moderate**	**Moderate**	**High**	**High**	**High**
LEVEL 3 MODERATE	Injuries that require time off work – Loss time injury – No Permanent disabilities	Serious reversible health effects that would require hospitalization	Serious impact on the environment. Reversible effects to flora and fauna, water resources, landscapes, topography, with short-medium term damage (1-5 years) to large areas of significance.	Negative media coverage at local / regional level over more than one day / Off - spec product / Community complaint resulting in social issue.	Major litigation or prosecution at Operation level	Property damage N$ 500 000.00 - N$ 2 Million Production loss between N$ 500 000.00 - N$ 2 Million	**3**	**Low**	**Moderate**	**Moderate**	**High**	**High**

LEVEL 2 MINOR	Medical treatment required – Treat and return to work	Adverse health effects that may require medical treatment - Treat and return to work	Moderate impact on the environment. Short term damage (<1 year) to small areas of limited significance	Complaint received from stakeholder or community / Negative local media coverage	Regulation breaches resulting in fine or litigation	Property damage N$ 20000.00 - N$ 500000.00 Production loss between N$ 20000.00 - N$ 500000.00	**2**	**Low**	**Low**	**Moderate**	**Moderate**	**High**
LEVEL 1 NEGLIGIBLE	First Aid Injury only	Little if any adverse health effects.	Minor impact on the environment. Limited damage to minimal area of low significance.	Negligible media coverage	Regulation breaches without fine or litigation	Property damage, under N$ 20000.00 Brief disruption of operation, production loss under N$ 20000.00	**1**	**Low**	**Low**	**Low**	**Moderate**	**Moderate**

Table 7-4. Overall risk/ significance rating scale

RISK RATING	TOLERABILITY DEFINITION	COLOUR CODE
Low	**Acceptable Risk** – monitor and manage risk	
Moderate	**Substantial Risk** – implement preventive actions where practical and monitor effectiveness of actions/ measures	
Moderate to High	**Substantial Risk becoming High**	
High	**High Risk** – significant and urgent controls required, implement preventive or mitigation actions promptly and closely monitor effectiveness of control action measures	

7.3 Assessment of Impacts

A complete assessment of the potential impacts identified for the proposed prospecting activities is presented in **Table 7-5** below.

Table 7-5. Assessment of identified impacts

IMPACTS ON SOIL	
Description of Potential Impact	Soil degradation (including change in soil structure) will result from soil disturbance caused by heavy machinery (e.g. front-end loaders) and tipper trucks; stripping of top and sub-surface soils; soil compaction by traffic on existing and new access roads; loss of original soil depth and volume; degradation of stockpiled topsoil due to erosion from runoff or wind; 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, increased surface runoff due to surface compaction, and concentrated water flow along erosional gullies resulting from open excavations
Status of impact (+ or -)	Negative
Impact Classification	Environmental and Image/ Reputation
Spatial Extent of impact	Site Specific and Local
Duration of impact	**Long term** – the structure and depths of soils will be altered for a long time if management controls/ measures are not effectively implemented. However, certain impacts such as soil contamination by hydrocarbon spills would have a short to medium-term impact if such spillages are effectively cleaned up regularly
Intensity of impact	Minor effects
Consequence Level	**Moderate (Level 3)**
Likelihood	Changes in soil structure and soil degradataion due to bulk excavation, traffic compaction are **Highly Probable (Likelihood = Level 5)** as removal of vegetation and disturbance of top and sub-surface soils are inevitable Soil pollution due to drilling fluid residues and hydrocarbon spills will have a **Level 4 Likehood of Occurrence** as oil pipe bursts can occur anytime

	Soil erosion will have a **Level 3 Likehood of Occurrence** as the main eroding agent would likely be water, which is generally scarse in the area due to the low mean annual rainfall of the area
Significance/ Risk Level (before no mitigation)	**Moderate** to **High**
Proposed preventive/ mitigation measures or controls	• Minimize footprint area of drilling and test quarrying operations, and therefore the disturbance footprint to a minimal area as much as possible • Minimize soil contamination through containment and handling of potential pollutants (e.g. oils, drilling fluids) • Implement soil conservation measures (e.g. proper placement and stockpiling of clean soils and overburden material, maintaining soil fertility of top soils stored for future reclamation and rehabilitation works) • Ensure that the overall thickness of soils placed during reclamation and rehabilitation is consistent with surrounding undisturbed areas and future land use • Design test quarries and access track roads such that their slopes are battered to an appropriate gradient for rehabilitation • Schedule prospecting work in such a manner that it does not coincide with periods of heavy rainfall to the extent practical • Avoid creation of new access roads to the extent practical • Make use of emergency spill trays underneath all machinery at all times • Avoid mixing of topsoil (which is typically rich in seeds) and sub-surface soils during stripping and stockpiling. Topsoil will have to be removed cautiously and safely stockpiled in a designated area for later use in rehabilitation work
Significance/ Risk Level (with mitigation)	**Moderate**
Confidence Level	**High**
IMPACTS ON CHANGES IN LAND USE	
Description of Potential Impact	The low laying areas are currently used as settlement areas with isolated homesteads and extensive savannah grazing land primarily for small stock (goats) and during the rare rainy period limited wildlife such as Springboks and Ostriches. Conversely, the high lying mountainous terrains (koppies) are generally free of human occupation and contain limited grass for grazing. Some of the succulent shrubs on these mountains are however also consumed by

	small livestock. The project infrastructures (e.g. exploration camp, new small access roads, target drilling and test quarrying sites) will require surface clearing of vegetation, ground levelling and excavation or backfilling (e.g. in river beds with thick sands), top and sub-surface soil stripping and development of top soil and overburden boulder stockpiles. These activities will certainly reduce (but to a limited extent due to the extent of the proposed prospecting work) the amount of available grazing land; and consequently alter the part of the area's current land-use from small stock farming to a combination of small stock grazing land and limited stone test quarrying.
Status of impact (+ or -)	Negative
Impact Classification	**Environmental** and **Community Relationships** (as the proposed activities may partly compete for space or conflict with small stock farming if the former is not properly managed as outlined in the accompanying EMP)
Spatial Extent of impact	**Site Specific** to **Local**
Duration of impact	**Medium term** because test sites created during prospecting will be limited in extent and will therefore be easy to reclaim or rehabilitate. Access tracks created for prospecting purposes will equally be of limited extent and can easily be rehabiliated to facilitate vegetation growth by closing off access to unsuccessful sites and ripping traffic compacted top soils to facilitate natural recovery of vegetation
Intensity of impact	**Minor effects**
Consequence Level	**Moderate (Level 3)**
Likelihood	**Possible to happen (Level 3)**
Significance/ Risk Level (before no mitigation)	**Moderate** – largely becuse the spatial extent of sites to be affected is limited
Proposed preventive/ mitigation measures or	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 access track roads, the exploration camp, and targeted

controls	test quarrying sites. Further control measures to reduce the risk of this impact include the following: • Target areas which are at least 400 m from existing homesteads and boreholes to minimize land use change close to sites of human settlement • Use existing access roads and avoid creation of new access roads to the extent practical. This will minimize the footprint of areas to be disturbed. • Place/ position the exploration camp(s) closer to target sites for drilling and test quarrying • The project proponent must promptly communicate any foreseeable conflicts with farming or human settlement activities to avoid compromising relationship with the affected communities
Significance/ Risk Level (with mitigation)	**Low** – largely due to the localized extent of the proposed activities
Confidence Level	**High**
IMPACTS ON TOPOGRAPHY AND LANDSCAPE	
Description of Potential Impact	Changes in landscape topography will result from the creation of spatially constrained test quarries in bedrock, stripping and stockpiling of overburden coupled with levelling of ground at the proposed exploration camp site. The creation of excavations in the ground will pose a safety hazard to the public, workers, farmers and animals in the affected areas
Status of impact (+ or -)	Negative
Impact Classification	**Environmental** **Image, Reputation and Community Relationships** **Safety**
Spatial Extent of impact	**Site Specific** to **Local**

Duration of impact	**Medium –term –** at sites where prospecting is unsuccessful and rehabilitation is implemeted soon after prospecting, impacts will be medium-term **Long-term –** where prospecting is successful and decisions to undertake continuous quarrying are taken, impacts would be long-lived
Intensity of impact	**Minor effects**
Consequence Level	**Moderate (Level 3)**
Likelihood	**Almost certain to happen (Level 5)**
Prevention	Complete prevention of this impact will not be possible unless the no go option is chosen
Significance/ Risk Level (before no mitigation)	**High**
Proposed mitigation measures or controls	• Implement ongoing rehabilitation practices, e.g. by reclaiming and rehabilitating unsuccessful test quarries immediately and associated access roads • Minimize safety risks to workers, the public and animals, as well as conflicting relationships with communities by fencing off active and preserved test quarry sites, and putting danger tapes around such sites • Target sites with exposed bedrock to the extent practical to avoid creation of overburden dumps • Where practical excavate test quarries adjacent to abandoned trenches created by small scale miners to minimize the extent of landscape and topography disturbance • Where deeper test quarries are created to extract sample blocks practice rockface blinding by placing natural waste rock material against exposed test quarry faces • Communicate to affected communities which specific sites will be left open for continuous quarrying so that they are aware to avoid walking/ driving to such sites or herding their livestock in close proximity to such sites
Significance/ Risk Level (with mitigation)	**Low**
Confidence Level	**High**
IMPACTS ON VEGETATION	

Description of Potential Impact	Fragmentation of floral habitats due site clearing over footprints of the proposed exploration camp, access roads, targeted drilling and test quarrying sites, and top soil plus overburden stockpile areas Fragmentation and deforestation from collection of fire wood and veld fires due to increased human population in the area Fall of dust from dust emissions arising from moving traffic and excavation works may adversely affect vegetation close to the disturbance sites through blinding. This impact is likely to be limited as prospecting will target areas with little to no soil cover (in the case of granitic intrusions) whilst areas of dolerite interest are largely covered with boulders and little soil which is usually the primary source of dust
Status of impact (+ or -)	Negative
Impact Classification	**Environmental**
Spatial Extent of impact	**Site Specific** to **Local,** but may extend to **Regional** scale in case of uncontrolled veld fires
Duration of impact	**Long term** because eventhough prospecting is only planned for the next 3 years, cleared vegetation is unlikely to recover completely within the next 5 to 10 years, especially at the test quarry sites and along active access roads
Intensity of impact	**Moderate** as vegetation over distrubance footprints will be removed completely for the duration of the proposed prospecting activities
Consequence Level	**Moderate (Level 3)**
Likelihood	**Almost certain to happen (Level 5),** except impacts due to veld fires
Prevention	Complete prevention of this impact will not be possible
Significance/ Risk Level (before no mitigation)	**High**

Proposed mitigation measures or controls	• Avoid illegal wood gathering by enforcing harsh measures to workers for non-compliance • Rescue any endemic species that may be destroyed by the proposed activities and donate them to registered nurseries • Make minor deviations to existing access roads to avoid areas of thick and/ or sensitive vegetation • Formulate and implement suitable and appropriate operational management guidelines for the cleared areas. Incorporated in the guidelines are the progressive rehabilitation measures. These should take into account: - Post closure land-use measures and/or establishment of self-sustaining indigenous vegetation. - Erosion management measures • No muddy and dirty equipment should be brought onto site as this is likely to carry seed of alien species • *The Moringa ovalifolia* tree which is a protected species in Namibia occurs on some of the dolerite ridges targeted for prospecting. During drilling and test quarrying the removal of this species should therefore be avoided.
Significance/ Risk Level (with mitigation)	**Low**
Confidence Level	**High** – this impact was studied in detail through the accompanying ecological/ biodiversity study
IMPACTS FROM SOLID AND LIQUID WASTE	
Description of Potential Impact	Solid waste will be generated in and close to working areas (e.g. drilling and test quarries, and the exploration camp); in areas where maintenance of machinery will be carried out; in sites where used parts, oils, grease, pipes, waste water and scrap metal will be stored; and from onsite support infrastructure such as container offices (e.g. paper waste). Such solid waste can cause littering, soil and water pollution, visual degradation, fatality to animals and health hazards.
Status of impact (+ or -)	Negative
Impact Classification	**Environmental** **Health** **Image/ Reputation**

Spatial Extent of impact	**Site Specific**
Duration of impact	**Medium term** as per the current explortion plan of up to 3 years
Intensity of impact	**Minor effects**
Consequence Level	**Minor (Level 2)**
Likelihood	**Likely to happen at some point (Level 4)**
Prevention	Prevention can be achieved if littering is forbidden; site staff are disciplined for non-compliance; adequate and safe storage space is provided for the storage of solid waste, used oils/ grease and scrap metals
Significance/ Risk Level (before no mitigation)	**Moderate**
Proposed mitigation measures or controls	• Ensure regular removal of general waste to an approved waste fill area in or close to Uis • Recycling or disposal to an approved hazardous or industrial waste site in or close to Uis • The only waste water will be domestic sewage and water used for washing industrial and domestic equipment, which should be treated and re-used as far as practical e.g. for dust suppression • Ensure provision of adequate waste skips at all working sites and at the exploration camp • Fence off areas where such waste is stored to eliminate possible contact with domestic and wild animals
Significance/ Risk Level (with mitigation)	**Low**
Confidence Level	**High**
IMPACTS ON INDIGENEOUS FAUNA (REPTILES, MAMMALS, BIRDS)	
Description of Potential Impact	Wildlife and domesticated animals are likely to be adversely impacted through displacement from footprints of the sites to be disturbed, fragmentation of floral habitats, potential fatalities due to contaminated surface water, road kills through collisions, undesired contact with litter and other toxic substances, and possible poaching.

	Domesticated and wildlife movement restrictions due to increased movement of vehicles/ plant and increased noise levels can induce stress. Potential loss of breeding sites for birds due to removal of trees and shrubs on the mountains. Fatalities from collisions with vehicles
Status of impact (+ or -)	Negative
Impact Classification	**Environmental** **Image/ Reputation**
Spatial Extent of impact	**Site-specific**: On and proximal to footprints of affected sites (e.g. access roads and immediate surrounds, drilling and test quarry sites, exploration camp)
Duration of impact	**Medium to long term** – Impacts will persist over the lifespan of the project, which at the moment is about 3 years (i.e. medium-term) in line with the validity period of the EPL. However, impacts associated with some of the sites such as test quarry sites where exploration yields positive results are likely to persist for longer
Intensity of impact	**Minor** as most wild animals will likely migrate away from the affected sites and dwell elsewhere not too far from their original places of residence
Consequence Level	**Moderate (Level 3)**
Likelihood	**Possible to happen (Level 3)**
Prevention	Complete prevention of this impact will not be possible
Significance/ Risk Level (before no mitigation)	**Moderate –** because incidences such as poaching, plant-animal collisions, poisoning of animals due to reckless storage of contaminants has not been known to occur in the business within the last 10 years
Proposed mitigation measures or controls	• Prevent animal access to exploration camp or active sites through fencing • Enforce speed limits and traffic control measures to minimise the risk of road kills • Prevent illegal hunting and trapping by enforcing harsh non-compliance measures to workers • Prevent creation of hazards by means of good "housekeeping" and prevention of litter • Any animal fatalities should be recorded and the causes established and remedied for monitoring purposes • Avoid disturbance of vulture and other bird nests (if any) during the breeding season

	• Avoid activities close to large trees near the base of the mountains • Cap or seal off drill holes to prevent small mammals from becoming trapped
Significance/ Risk Level (with mitigation)	**Low**
Confidence Level	**High**
DUST IMPACT ON AIR QUALITY	
Description of Potential Impact	Generation of excessive dust could result from site preparation earthworks, test quarrying activities, and running traffic on access roads. Toxic emissions such as carbon monoxide will also increase in the area due to increased number of vehicles and machinery. The generated dust will reduce visibility across the site and adversely impact on the respiratory well-being of personnel working or resided in close proximity to the source areas. Additionally, photo-transpiration efficiency of the surrounding plants may be hampered. Dusty plants are less palatable to grazing or browsing animals, and therefore availability of edible pasture for animals may be diminished. If air quality dust levels exceed the acceptable thresholds stipulated in relevant standards such as SANS 1929: South African National Standard: Ambient Air Quality are consistently exceeded with no effort to remediate, then there could be legal implications for the project proponent.
Status of impact (+ or -)	Negative
Impact Classification	**Safety** **Health** **Legal** **Image/ Repuation** **Environmental** **Financial**

Spatial Extent of impact	**Site Specific** and possibly **local** depending on the mobility of solid particulates and prevailing weather (wind speed, wind direction, precipitation, etc) conditions. Typically dust from from quarrying activities affects areas within 2 – 3 km of the source, beyond which air quality conditions normalize. For dust generated from site preparation earthworks (bulk excavation work) and test quarrying activities on very windy days could travel further than 15km because the source is generally fixed, is a single vector to the affected site and will not move unlike the dust generated from moving traffic on dirt access roads. Flora whose functioning will be adversely affected by dust cover are those directly downwind.
Duration of impact	**Medium term** as the dust generating activities will be ongoing throughout the exploration program, which at the momnet is capped to 3 years (i.e. the validity period of the license). Dust from unrehabilitated access roads and test quarrying sites could be **Long term**.
Intensity of impact	**Minor effects** as air quality conditions will be altered temporarily for the period of these dust generating activities and until such time that natural vegetation in cleared areas recovers to a reasonable extent
Consequence Level	**Major (Level 4)**
Likelihood	**Almost certain to happen (Level 5)**
Prevention	• Complete prevention of dust generation from the proposed activities is inevitable
Significance/ Risk Level (before no mitigation)	**High** Stripping, bulk excavation and test quarrying activities will adversely change the ambient air quality and visibility conditions that often prevail. Hauling trucks and light vehicles will create dust plumes and toxic emissions trailing behind them, but this will be limited by speed restrictions. The impact is persistent for the duration of the exploration program, and most likely after the end of exploration if inadequate rehabilitation is implemented due to the increased footprint of areas with no vegetation. There could be financial loses (e.g. damage to vehicles, plant and animal fatalities) due to collisions arising from poor visibility conditions.
Proposed mitigation measures or controls	• Stockpile loose top and sub-surface soils in designated areas away from places of residence • Avoid clearing vegetation unnecessarily or too far in advance of test quarrying • Place crushed gravel with less fines on access roads close to homesteads to minimize dust levels • Drill machines must be fitted with dust filters • Ensure minimum travel distances between working areas and stockpiles

	• Ensure that all vehicles and machinery are maintained in good working condition and that they are serviced on regular basis • Ensure that all vehicles are switched off when stationary – no vehicles should be idling for extended periods • Enforce speed limits of 50 km/ hour, and lower proximal to places of residence • Avoid stripping and bulk excavation activities on very windy days • Train personnel to wear personal protection equipment at all times • Test personnel health at regular intervals and implement dust monitoring from the start of exploration by means of installing simple dust fallout buckets 500m, 1km and 2km down-wind of key exploration target areas • Provide a complaint register on site where complaints can be made. This register should enable effective communication of complaints where these are reasonably addressed. All complaints regarding air quality should be adequately investigated and actions taken to reduce the impact in a timely manner should it be required • Implement and maintain a Dust and Emission Management Plan which provides clear details on preventing, maintaining and improving the air quality in terms of site-specific activities. This plan could possibly incorporate a dust fallout monitoring programme should it be evident that dust emissions is a problem • Avoid burning of waste material on site • Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable
Significance/ Risk Level (with mitigation)	**Moderate**
Confidence Level	**Moderate** • Dust monitoring program must be implemented right from the start of stripping and test quarrying to monitor dust levels close to places of residence and in the open veld. Control sites for monitoring must also be set up in areas far from active or targeted sites to establish ambient air quality conditions
NOISE IMPACTS FROM TEST QUARRYING AND MOVING VEHICLES/ PLANT	

Description of Potential Impact	Noise will be generated from drilling and test quarrying activities as well as from moving vehicles and plant. The magnitude of this nuisance factor will depend on the proximity of the exploration sites and access roads to places of residence and sensitive animal habitats, and on operational factors such as working times. The proposed activities will potentially contribute to the cumulative effects of traffic noise in areas within 2 – 3 km from targeted exploration sites. Hence the homesteads located close to the targeted exploration sites will be adversely affected. The noise may also result in forced migration of wild fauna such as birds and mammals in the affected areas. The impacts also include noise exposure and possible hearing loss on machine operators. If ambient noise levels consistently exceed the recommended accepted highest threshold values stipulated in relevant standards such as South African National Standard (SANS) – Code of Practice, SANS 10103:2008, and no effort is being made to remediate that, then there could be legal implications for the project proponent.
Status of impact (+ or -)	**Negative**
Impact Classification	**Safety** **Environmental** **Legal**
Spatial Extent of impact	**Site specific** and **Localized** (due movement of traffic)
Duration of impact	• Drilling and movement of plant and vehicles – 12 hours/day x 6 days/week • **Medium term** (up to 3 years as per the current validity period of the license)
Intensity of impact	**Minor Effects** – certain environmental functions and processes could be temporarily altered in vicinity of active areas for example due to forced migration of fauna.
Consequence Level	**Minor (Level 2)**
Likelihood	**Likely to happen at some point (Level 4)**
Prevention	Noise creation cannot be prevented completely and will occur and should be mitigated as best as possible.
Significance/ Risk Level (no mitigation)	**Moderate**

Proposed mitigation measures or controls	• Regular maintenance of drilling and earth moving machinery should maintain noise to acceptable levels for operators and the public. • Standardized noise measurements should be carried out on individual equipment at the delivery to site to construct a reference data-base, and regular checks carried out to ensure that equipment is not deteriorating and to detect increases which could lead to an increase in the noise impact over time and increased complaints. • The activities are to take place during day time (07h00 to 18h30) only to minimise nuisance to residents. Periods of silence during the day may be necessary. • When working in areas within 500m of homesteads silencers should be fitted and maintained on diesel powered equipment and vehicles • Train personnel to adhere to operational procedures that reduce the occurrence and magnitude of individual noisy events • Leave as much vegetation in the surrounding as possible to act as noise buffers • Keep farmers informed of planned drilling, earth moving and test quarrying schedules through fortnightly radio announcements through the traditional authorities. • Keep a log book of noise complaints and implement remedial actions promptly as far as practical • 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:

	•

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

Note: Daytime: 06:00 to 22:00, Night-time: 22:00 to 06:00.

1) Equivalent continuous rating levels that include corrections for tonal character and impulsiveness of the noise and the time of day.

2) Equivalent continuous rating levels that include corrections for tonal character and impulsiveness of the noise.

Significance/ Risk Level (with mitigation)	**Low**
Confidence Level	**High**

IMPACTS ON SURFACE WATER RESOURCES	
Description of Potential Impact	There is not much surface water in the area but runoff does occur during rainy seasons. Potential contamination of surface water will result from: reduced quality of runoff and seepage water from test quarrying excavations, stockpiles of top soil and waste rock dumps; accidental discharge of effluent from drilling and domestic activities; accidental discharge/ spillage of grease, oil, and other hydrocarbon from working machinery and storage facilities; the use of water for equipment lubrication and cooling; erosion from open access roads and open excavations resulting in the mobilisation of loosened sediments into small streams and rivers. Additionally plumes of oily and/ or greasy water can have adverse visual and reputational impacts for the project.
Status of impact (+ or -)	**Negative**
Impact Classification	**Environmental** **Health** **Image/ reputation** **Legal**
Spatial Extent of impact	**Local to Regional –** as active streams can flow over long distances, thereby carrying pollutants with to other areas
Duration of impact	**Medium Term** – as per the current validity period of license of 3 years. Contaminants may however stay in the water stream for a long time
Intensity of impact	**Minor effects** - except during sporadic periods of heavy rains
Consequence Level	**Moderate (Level 3)**
Likelihood	**Possible to happen (Level 3)**
Prevention	• Prevention of surface water pollution due to hydrocarbon spillages is possible if stringent measures are implemented

	• Complete prevention of surface water pollution due to mobilization of loosened sediments is not possible
Significance/ Risk Level (no mitigation)	**Moderate**
Proposed mitigation measures or controls	• Ensure that all targeted drilling and test quarrying activities will not encroach any significant water sources trasversing the project site. To ensure this during the exploration phase buffers of 100m shall be maintained around main channels and tributaries, and if the project proceeds to mining phase such buffers must be delineated more accurately using the predicted extent of the 1% annual exceedance probability (i.e., the 1 in 100-year) flood event. • Maximise the recycling and reuse of external water during drilling and test quarrying operations. This will minimise water demand from the external sources • Establish water quality control procedure involving regular sampling and quality testing at sites downstream of active sites • Keep clean water away from test quarrying, drilling and exploration camp sites through the use of simple diversion channels • Store effluent waste water in designated septic tanks at the exploration site and regularly drain this by hiring a registered waste water management entity • Apply erosion controls such avoiding leaving open excavations in streams and river beds to minimize sediment runoff • Make use of emergency spillage trays at all active sites to minimize risk of surface water contamination from hydrocarbon spillages
Significance/ Risk Level (with mitigation)	**Low**
Confidence Level	**High**
IMPACTS ON GROUNDWATER	

Description of Potential Impact	Groundwater in the project site is the main source of water for both human and animal consumption. For this reason, the value of this resource cannot be overlooked. Potential contamination of groundwater by residues of drilling fluids, fuels and oils from vehicles and machinery used at drilling and test quarrying sites; spillage and subsequent infiltration of hydraulic fluids or domestic waste water (e.g. effluent from exploration camp kitchen and toilets). Other potential sources of groundwater contamination may include seepage of wash water from vehicles. Where test quarries are relatively deep and intercept the water table, groundwater will be adversely impacted by dewatering of such pits and possible contamination from hydrocarbon spillages from the cutting equipment. The above impacts are however unlikely to occur due to the deep nature (>90 m) of the water table as observed from boreholes on Farm Nudanab and in the Omihana area
Status of impact (+ or -)	**Negative**
Impact Classification	**Environmental** **Community Relationships** **Health**
Spatial Extent of impact	**Site specific** due to the spatially discrete nature of drilling and test quarrying sites During exploration no groundwater abstraction will take place as all water will be carted to the project site from Uis. Hence, groundwater levels nor the cone of depression will be affected by the prospecting activities. However, where groundwater is intercepted by drilling or test quarrying activities, the quality of the groundwater may be adversely affected.
Duration of impact	If groundwater is intercepted, then potential for contamination will exist for as long as the prospecting activities continue
Intensity of impact	**No lasting to Minor effects**
Consequence Level	**Minor (Level 2)**
Likelihood	**Not likely to happen (Level 2)**
Significance/ Risk Level	**Low**

(with no mitigation)	
Proposed mitigation measures or controls	• Due to the shallow nature (<30 m) of the planned drilling and test quarrying activities, it is highly unlikely that any groundwater will be intercepted during. Hence why the impacts on groundwater resources are perceived to be low. • If any groundwater is intercepted in test quarries, pump, store and reuse such water • Maintain all vehicles to prevent spills of oils, hydraulic fluids, etc • No effluent water should be discharged into the environment. Effluent and sewage water from the exploration camp should be collected in septic tanks and regularly collected by designated sewage management entity for safe discharge at a suitable location in Uis • Bund all hazardous liquid storage installations such as the trailer mounted diesel tank • Baseline groundwater quality measurements should be established right before the commencement of the planned activities by sampling groundwater from existing domestic boreholes. During prospecting groundwater samples should be collected every 6 months from existing boreholes for quality testing at one of the local laboratories and monitoring. Water quality tests to be performed shall include pH, electrical conductivity, total dissolved solids, turbidity, salinity, hardness, total hydrocarbons, alkalinity, major ions (such as Ca, Mg, Na, K, Nitrate, CO3, HCO3, Cl, SO4) and metals (such as Mn, Pb, Zn, Fe) as per Namibia's Department of Water Affairs' requirements for water supplies for drinking water and for waste water treatment and discharge • Any waste water (effluent) to be discharged into the environment would require an Article 21 Permit from the Minister of Agriculture, Water and Land Reform, and such effluent shall comply with the following minimum standards before being released into the environment:

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
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 (!gravimetric 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/ Risk Level (with mitigation)	**Low**
Confidence Level	**High**

IMPACTS FROM NON-PROSPECTING/ NON-MINING WASTE	
Description of Potential Impact	These impacts will result from the presence of: • general waste such as food scraps • Recyclable waste such as steel cans • Green waste such as cleared vegetation • Used and not fit for purpose personal protective equipment • Used machinery spares (e.g. oil and air filters, tyres, batteries, etc) • Wooden pallets • Scrap metals • Waste oils, grease, oily water
Status of impact (+ or -)	**Negative**
Impact Classification	**Environmental** **Health** **Safety** **Image/ Reputation**
Spatial extent of Impact	**Site Specific**
Duration of Impact	**Medium term –** in correspondence with the validity period of the EPL of 3 years
Intensity of impact	**Minor effects**
Consequence Level	**Moderate (Level 3)**
Likelihood	**Almost certain to happen (Level 5)**
Significance/ Risk Level	**High**

(with no mitigation)	
Proposed mitigation measures or controls	• General waste including used PPE will be stored on site in designated bins and regularly collected for transportation to waste facility in Uis • Recyclable waste will be stored on site in designated bins and regularly collected for transportation to designated waste facility in Uis • Following clearing, vegetation removed shall be stockpiled and burnt on site. Due care shall be taken by the site supervisor ensure that such fires are well contained to avoid unwanted veld fires • Used wooden pallets will be collected and temporarily stored on site for possible reuse. Pallets that are not fit for reuse shall be transported to waste storage facility in Uis or possibly used for fire wood by the exploration crew • Scarp metals will be temporarily stored at the project site, in a fenced off area, prior to removal by a licensed scrap metal recycling contractor on a regular basis • Waste liquids (oils, grease, sludge) will be collected and stored in designated tightly sealed containers on site and ultimately removed by a licensed recycling contractor on a regular basis • Used tyres will be collected in designated waste bins and transported off site by a license contractor
Significance/ Risk Level **(with mitigation)**	**Low**
Confidence Level	**High**
OCCUPATIONAL HEALTH AND SAFETY IMPACTS	
Description of Potential Impact	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, emissions and noise; threat to human safety and damage to property from emergency and veld fires; continuous exposure to diesease vectors such as mosquitos; and contact with hazardous materials such diesel and hydraulic fuels. Where deeper test quarries are created there may be risk of side wall collapse if side walls are unstable. Under circumstances where disabilities and/ or fatalities occur, there may be legal action and or financial implications to the project proponent

Status of impact (+ or -)	**Negative**
Impact Classification	**Health** **Safety** **Reputation/ Community relationships** **Legal** **Financial**
Spatial Extent of impact	**Site specific**
Duration of impact	**Variable (from Very short-lived** to **Permanent)**
Intensity of impact	**Variable (from Minor** to **Serious Effects)**
Consequence Level	**Moderate (Level 3) –** consequence level not high because of the limited number of workers and moving machinery required during the prospecting phase
Likelihood	**Likely to happen at some point (Level 4)**
Prevention	Prevention of the above impacts can be enhanced through the implementation of the following meadures: ✓ Having user-friendly Operational procedure manuals ✓ Offering adequate Health and safety training to new personnel and visitors ✓ Continuous enforcement of stringent housekeeping rules ✓ Colour coding areas, pipes, equipment and substances ✓ Training and enforcement ofthe use of safe working procedures and permits to work ✓ Having an emergency response plan for all occupational and working sites ✓ First aid treatment training to employees on site ✓ Daily safety reminders, meetings and/or drills ✓ Develop a risk register and conduct a comprehensive risk assessment prior to commencement of prospecting activities

	✓ If test quarry walls are higher than 5 m the proponent must ensure they regularly consult a geotechnical professional to check the stability and integrity of such walls.
Significance/ Risk Level (without controls or mitigation)	**High**
Proposed controls / Mitigation	• Procedures for dealing with injuries or accidents must be in place and all contact details for emergency personnel available. JTD Mining's safety and emergency response manual must be applied. Such manuals must be developed based on statutory requirements stipulated under the Labour Act. • 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 70 to 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. • Dust will be released into the air at test quarrying, soil stockpile sites and access roads. SABS 1929 (2005) provides the following standards for PM10 particulate matter: - The daily limit for the protection of human health over a 24hour period is 75 µg/m^3 - The annual limit for a calendar year is 40 µg/m^3 - 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 - Water brought to site 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 • Record and report all health and safety incidences • The following features of the project's design and management will reduce risk of mosquitos breeding on the project site: - Used tyres that may be generated on site, that could contain pooled water and act as breeding ground for mosquitos, will be transported to designated waste disposal sites in Uis regularly

Significance/ Risk Level (with controls or mitigation)	**Low**
Confidence Level	**High**
POTENTIAL SECURITY ISSUES	
Description of Potential Impact	• Potential increase in livestock theft and illegal wildlife hunting due to more people being in the area • Potential compromise on security of farmers
Status of impact (+ or -)	**Negative**
Impact Classification	**Community Relationship**
Spatial Extent of impact	**Local** (Project farms and settlements)
Duration of impact	**Medium Term –** i.e. for as long the prospecting is ongoing
Intensity of impact	**Minor effects**
Consequence Level	**Major (Level 4)**
Likelihood	**Unlikely to happen (Level 2)**
Prevention	Prevention is possble if stringent security and non-compliance actions are enforced
Significance/ Risk Level (without controls or mitigation)	**Moderate**
Proposed controls / Mitigation	• Make compliance to JTD Mining's security and no theft tolerance policy a condition of employment • Enforce stringent measures/ actions for non-compliance • The management of JTD Mining must work with leaders of the affected communities and the 2 conservancies to monitor and take decisive action against any illegal hunting or theft activities • Enforce reporting of theft and other security related incidences

Significance/ Risk Level (with controls or mitigation)	**Low**
Confidence Level	**High**
VISUAL IMPACTS AND LIGHTING	
Description of Potential Impact	Compromise on the scenic value of the project site may arise from changes to the topography and physical landscape due to open excavations, top and sub-surface soil stockpiles, stockpiles of waste rock, widening of access track roads, as well as the presence of machinery and stationary containers in the area. Since the project site is in a rural setting, lighting at night could also add to visual impacts as such lighting would be visible from far. Due to the intervening topography and vegetation between the project site and sensitive receptors (e.g. the C35, D3714 and D3715 gravel roads), the project is not anticipated to be visible from major viewing locations except from the limited number of homesteads in the area
Status of impact (+ or -)	**Negative**
Impact Classification	**Environmental** **Image/ Reputation/ Community Relationships**
Spatial Extent of impact	**Localized**
Duration of impact	**Medium-term** (presence of containers, machinery, and increased lighting at night) to **Long** (un-rehabilitated sites, new access tracks)
Intensity of impact	**Moderate Effects**
Consequence Level	**Moderate (Level 3)**
Likelihood	**Possible to happen (Level 3)**
Prevention	• Prevention of the scenic impacts is not possible.

Significance/ Risk Level (without controls or mitigation)	**Moderate**
Proposed controls / Mitigation	• Ensure that there are no elevated overburden dumps or final voids post test quarrying • Drilling sites will be progressively rehabilitated to create landscape similar to surrounding undisturbed savannah bushland • Unsuccessful test quarrying sites will equally be rehabilitated progressively • As far as is practical no vegetation is to be removed unnecessarily. Where new access roads roads are to be constructed, the methods should be low intensive and possibly use manpower and not machines for clearing. • Test quarries where exploration results are positive shall be battered to safe angles or possibly turned into temporary earth dams with gently sloping sides whilst a mining license is being acquired. • Care shall 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.
Significance/ Risk Level (with controls or mitigation)	**Low**
Confidence Level	**Medium –** Recovery rates of vegetation in once cleared sites are unknown and will need to be established during the quarrying phase through a well formulated vegetation recovery monitoring program.
IMPACTS ON LAND USE (LAND USE CONFLICT ISSUES)	
Description of Potential Impact	Currently the proejct site is primarily used for agricultural (mainly small stock farming) purposes and biodiversity conservation. Introducing the third aspect (i.e., prospecting of mineral resources) will introduce conflict in so far as land use is concerned because whilst faming and nature conservation aim to preserve vegetation and ambient natural conditions, prospecting activities on the other hand will inevitably involve modifications to the bio-physical character of the proejct site through the creation of access roads; stripping and overburden removal activities; generation of dust and noise; frequent movement of machinery; introduction of scarred landscapes; transportation of sample blocks and water by trucks on roads that are often busy with tourists; and possibly fencing off of selected

	sites where prospecting yields positive results. Collectively, this could introduce conflict between the subsistence farmers or conservancies and the mining proponent. The impacts are typically aggravated by poor communication to affected communities, and prolonged unresolved conflict can result in retaliation by affected communities with consequent damage to equipment.
Status of impact (+ or -)	**Negative**
Impact Classification	**Community Relationships** **Legal** **Financial Loss**
Spatial Extent of impact	**Site Specific**
Duration of impact	**Medium-term** – in alignment with the validity period of the EPL which is 3 years
Intensity of impact	**Variable (Minor to Serious effects),** depending on how well managed the relationship between JTD Mining and the affected communities are managed upon commencement of exploration
Consequence Level	**Major (Level 4)**
Likelihood	**Possible to happen (Level 3)** – due to the conflicting nature of the land use activities conflict between the affected communities/ conservancies and JTD Mining will possibly occur
Prevention	Prevention is not entirely possible due to the inherent conflicting nature of the land uses, but the conflict can be minimized and managed to acceptable levels if the mitigation/ management measures below are actioned
Significance/ Risk Level (without controls or mitigation)	**High**
Proposed controls / Mitigation	• From the onset the project proponent must ensure that they maintain transparent and inclusive communication channels with the leadership and communities of Daure Daman, Omihana, and the two

	communal conservancies • Local government (e.g., the traditional authorities, leaders of the 2 conservancies and constituency councillors) must assume a leadership role in coordinating and promptly attending to any conflicts that arise between the affected communities and the project proponent • The management of JTD Mining must honour all promises made during to the affected communities during the public consultation meetings held in so far as creation of employment and procurement opportunities to locals, rehabilitation of community boreholes, and possible assistance or partnerships with small-scale miners are concerned
Significance/ Risk Level (with controls or mitigation)	**Moderate**
Confidence Level	**High**
IMPACTS ON HERTIAGE/ ARCHAEOLOGICAL RESOURCES	
Description of Potential Impact	Any archaeological/ heritage/ historic sites of importance within the EPL 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.
Status of impact (+ or -)	**Negative**
Impact Classification	**Environmental** **Image** **Legal** **Financial loss**
Spatial Extent of impact	**Site specific**

Duration of impact	**Permanent**
Intensity of impact	**Minor effect**
Consequence Level	**Level 4 (Major)**
Likelihood	**Possible**
Prevention	Impacts of this nature can be avoided if the site locations are known. Where exact locations are not known, risk of disturbeance or complete destruction can be achieved by using spotters during excavation and test quarrying. Continuously documenting the locations of new discoveries can also help prevent future disturbance.
Significance/ Risk Level (without controls or mitigation)	**High**
Proposed controls / Mitigation	• 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. • Use spotters during shallow excavation works • Survey the spatial extent and exact locations of know sites
Significance/ Risk Level (with controls or mitigation)	**Moderate (as some sites will likely remain unknown)**
Confidence Level	**Medium -** Knowledge of the whereabouts of any other archaeological/ heritage sites remain unknown.
PUBLIC PERCEPTION	
Description of Potential Impact	It is not possible to apply the assessment table to this issue. Public perceptions just needs to be managed through the establishment and optimization of transparent and inclusive communication channels such as quarterly progress meetings with the communities, having an accessible complaints register on site and regularly reviewing and taking actions to pertinent complains

7.4 Decommissioning and Closure

The decommissioning phase refers to the cessation of all prospecting activities as well as the removal and/ or rehabilitation of any sites which will not be utilized or developed during the continuous quarrying phase. It is of paramount importance to admit that disturbance of the earth's surface by any form of intrusive prospecting activity will result, at least to some spatial extent, in complete removal of existing vegetation and disturbance or modification of habitats over the disturbed area. The impacts of this usually are significant, but localized to the disturbed footprint, and the overall geographical extent of the impact is dictated by the intensity of the intrusive prospecting activity and the sensitivity and recovery rate of the receiving environment. Regardless of the preceding factors, the resultant impacts on the environment can be lessened by planning and executing such activities with closure in mind.

The objectives of decommissioning and closure for an exploration project such as this are to:

- Ensure that sites where prospecting results point towards the absence of good quality rock for dimension stone are fully rehabilitated and restored to a safe and similar, to the extent practical, state as the immediate surroundings. Where restoration to the original state is not practically achievable due to budgetary constraints or lack of sufficient material for backfilling, such excavations can be battered to safe angles and turned into water dams for extra storage during periods of heavy rains and runoff
- Ensure that sites which will be developed for continuous quarrying are kept safe whilst a mining license is being applied for
- Comply with relevant regulatory requirements and attain regulatory consensus on the successful closure and rehabilitation of the Project area
- Comply with the demands of the affected communities in so far as site restoration and rehabilitation are concerned, and main a positive public image
- Execute restoration 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 landform that is stable and one which aesthetically blends into the surrounding landscape, yet as far as possible does not impend possible future land uses
- Remove plant, machinery and containers that will not be required for the quarrying phase, and
- Relocate the accommodation camp closer to sites where prospecting yielded positive results and continuous quarrying is likely to take place after granting of the mining license.

7.5 Site Rehabilitation

The proponent shall keep the disturbed areas to a minimum; trees and other plants should not be removed unless necessary; selective test 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 practical before opening new ones.

7.5.1 Planning for Rehabilitation

Each drilling and test quarrying site will typically have distinct characteristics which would ultimately influence the procedures to be adopted in the rehabilitation program. These characteristics may be obvious but critical differences are often only identified by careful assessment of various factors for each site. The envisaged post exploration land-use will also typically influence the rehabilitation procedure to be implemented.

Below are generic best-practice rehabilitation practices as recommended by 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 the site and make the area to be rehabilitated safe. For this project this shall involve the following:
    - Removal of drilling and blade saw cutting equipment from the site; sealing of drill holes, backfilling of excavations and spreading of top soil, ripping and closure of access roads if the site will not be subjected to continuous quarrying. Alternatively, if continuous quarrying is likely to take place leave excavations open but fence off the site while the mining license is being issued. Safely park and stored all machinery and equipment at the exploration camp.
    - Removal of all industrial and domestic solid and liquid waste by a licensed contractor for disposal at approved sites in Uis. Care is required with residual toxic or hazardous materials including contaminated packaging and containers
2. **Pollution Control**: Progressive rehabilitation will be implemented to stabilize disturbed areas as quickly as practical and to limit erosion, soil degradation, poisoning of fauna, and pollution of water sources. Collectively, this shall involve the following:
    - Restricting clearing to areas essential for the testing work required
    - Minimizing length of time disturbed soil is exposed

- Diverting run-off from undisturbed areas away from the working areas to avoid possible contamination

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 spread over rehabilitated areas to promote successful vegetation establishment:
    - Minimize the length of time that topsoil material is 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 encourage runoff infiltration and minimize erosion.

The full details of the rehabilitation plan for this project are covered in the accompanying EMP.

8 CONCLUSIONS

8.1 Overall summary of the Results of Impact Assessment

Table 8-1 provides a summary of the impact assessment results from Chapter 7. For each potential environmental impact or issue, the residual risk or significance level is stated. Where further investigations are deemed necessary to better understand the risk associated with a specific impact, this is indicated in the last column of the table.

Table 8-1. Summary of potential impacts or issues

Potential Impact	Residual Significance Level (post mitigation)	Aspects requiring further investigation or monitoring
Impacts of slope instability in test quarries	Moderate	Regularly conduct slope stability assessments in test quarries deeper than 5m by a geotechnical

		specialist
Impacts on soil degraddation and erosion	Moderate	None
Impact on land use change	Low	None
Impact on topography and physical landscape	Low	None
Impacts on vegetation	Low	Monitor rate of vegetation re-establishment or recovery
Impacts on Indigeneous Fauna	Low	Develop a record of all mamals, birds, insects, and reptiles observed. Also record all animal fatalities
Impacts on Air Quality	Moderate	Implement dust fall out monitoring on commencement of exploration
Impacts of noise & vibrations from quarry	Low	Design of drilling and quarrying equipment
Impact on Surface Water	Low	Monitor water quality in tributaries downstream of drilling and test quarrying sites
Impacts on Groundwater	Low	Periodic water quality testing and monitoring in exisitng boreholes
Impacts from non-prospecting waste	Low	None
Impacts on Occupational Health and Safety	Low	Keep a record of medical results for workers
Potential Security Issues	Low	Establishment of access control points; Enforce in Conditions of Employment
Visual Impacts	Low	None
Impacts on Heritage/ Archaeological Sites	Moderate	Implement chance find practice
Impacts from Land use conflict	Moderate	Review complains launched on a quarterly basis and develop a log of issues that persistently come up

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 A certain number of people are made better off without anyone else being made worse off, then a project is considered efficient in environmental economics terms.

The project is expected to bring about significant socio-economic benefits to the area of Uis, mainly in the form of employment and procurement opportunities if it proceeds to the quarrying phase. Increased spending power of employees will further help local business to pick up, which will further contribute to the economy of the region. Taxes from JTD Mining to the Namibian Government will benefit the country in the form of tax revenues.

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, removal of solid and liquid waste from site, and transportation of sample blocks to processing facilities in Karibib or Walvis Bay.

Equity: The equity criterion relates to the distribution of costs and benefits in the affected society. A project is equitable if it brings about a situation whereby inequality levels are reduced and livelihoods are improved.

The project will benefit local people without disadvantaging them in any way. Locals will not suffer any displacement or loss of land or be subject to adverse health and safety conditions. The distribution of benefits will be limited during the prospecting phase, but will improve if the project advances to the quarrying phase. Direct benefits will include remuneration to employees, surface lease to the traditional authority, while indirect benefits would include increased work opportunities in 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 JTD Mining, through the completed desktop study work, that the raw materials of dolerite and granite within the project site generally occur in abundance, and only a small fraction will be exploited over the lifetime of the envisaged quarry operation.
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 exploration drilling and test quarrying of dolerite and granite on EPL 6217, assess their significance/ risk level, 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 newspapers advertisements in three local newspapers; site/public notices placed at key accessible locations in Uis and within the project site; as well as via email and SMS communications to identified and registered I&APs. The potential impacts identified therefore took account of those identified by the EAP as well as issues and concerns raised by the I&APs through the various communication platforms.

One-on-one interactions were held with the affected communities, including the leadership of these communities and the 2 communal conservancies. The interested and affected parties provided their inputs and raised all concerns they had on the proposed project activities and these were captured and documented in the accompanying Issues and Response Trail (**Appendix I**). 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 spatially constrained nature of the proposed prospecting activities, coupled with the non-pristine nature (due to historical and ongoing small-scale quarrying) and moderate sensitivity of the project area, the potential environmental and socio-economic effects are limited and can practically be reduced to acceptable levels upon implementation of the various mitigation measures provided in Table 7-5. Additionally, it is envisioned that the disturbed footprints from access roads, drilling and test quarrying are not expected to cause irreversible harm to the environment. Drill holes, access roads and test quarries can be fully rehabilitated, would re-vegetate after rainfall seasons if the proposed measures are implemented as suggested in this report.

Based on this and the residual risk or significance level of the impacts identified after implementing the proposed mitigation measures, it is recommended that an Environmental Clearance Certificate can be issued for the proposed prospecting activities on EPL 6217; with conditions that the various impact management and mitigation/ enhancement measures outlined in this report as well as in the accompanying EMP report be fully implemented and their effectiveness monitored during the operational phase.

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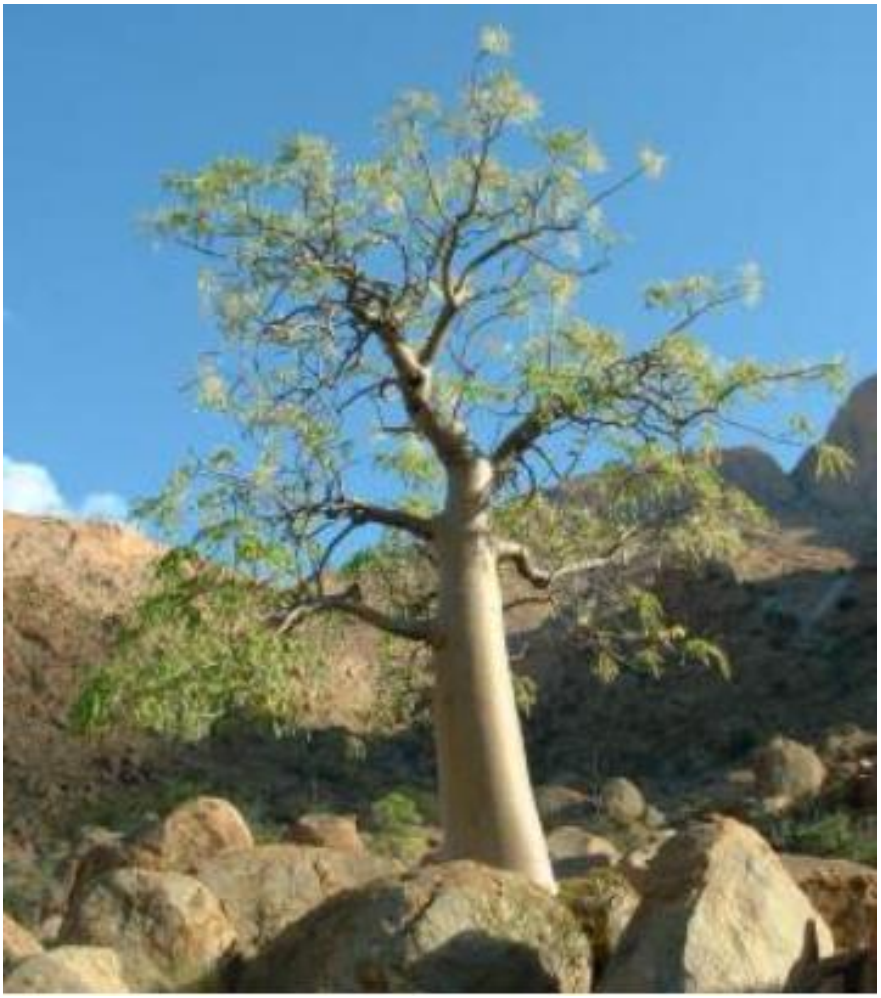
Environmental Concerns in South Africa: Technical & Legal Perspectives.

APPENDIX D – BIODIVERSITY IMPACT ASSESSMENT

Biodiversity Assessment Report



Proposed Exploration Activities for Dimension Stone quality granite and dolerite on Exclusive Prospecting License (EPL) 6217, Daures Constituency, Erongo Region, Namibia

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Windhoek, Namibia

February 2021

Contents

1. Introduction

It is noted that biodiversity is the variability among living organisms from all sources and the ecological complexes of which they are part, ranging from birds in the air, fish in rivers, and micro-organisms in the soil and diversity of ecosystems. This variability is essential for ecosystems to function efficiently. Ecosystems provide 'ecosystem services' to organizations and society as a whole, including poverty alleviation, food, fresh water, wood and fibre, medicines, soil fertility, climate regulation, building materials, inspiration for scientific and technical development, genetic resources, flood regulation, and recreation facilities.

Biodiversity is important to the present and future operations of all types of organisations, regardless of their size, sector, or location. By managing its biodiversity-related activities proactively, the society can realize many benefits.

It is therefore crucial to take into account potential impacts (both positive and negative) on biodiversity of any given undertaking. The purpose of the biodiversity study for the EPL 6217 was to:

- Review existing relevant information to identify the plant species that occur or are thought to occur in the area, with emphasis on those that are protected by legislation,
- Divide the area into broad sensitivity zones according to plant species vulnerability, ecological and scientific value as well as scenic value.
- Consider the potential impacts on the flora that might result from construction and operation of the proposed small-scale mining activities.
- Identify and suggest mitigation measures and methods that could be considered to minimise impacts during the construction and operational phases of the project to be included in an EMP.

2. Mining and Biodiversity

Through land disturbance, mining operations throughout its life cycle have significant direct and indirect impacts on biodiversity. Direct or primary impacts from mining can result from any activity that involves land clearance such as access road construction, exploration drilling, discharges to the air such as dusts and fumes emissions. Indirect or secondary impacts can result from social or environmental changes induced by mining operations and are often harder to identify immediately. It is therefore important that Dwyka Investment cc management recognizes that it cannot only have a responsibility to manage its impacts on biodiversity, but also an opportunity to make a significant contribution to biodiversity conservation through the generation of knowledge, and the implementation of initiatives in partnership with other biodiversity stakeholders.

3. Namibian commitment to international standards and guidelines

Namibia is a signatory to the Convention on Biodiversity, committing it to the preservation of species, particularly rare and endemic species, within its boundaries. As a signatory also to the Convention to Combat Desertification it is also bound to prevent excessive land degradation that may threaten livelihoods.

The principles contained within the Convention on Biological Diversity and other international conventions on sustainable development have increasingly become encouraged through the enactment of regional, local laws and policies to make biodiversity conservation an integral part of the good practice in companies that operate mining business in Namibia.

4. Legal requirements

Several legal instruments are applicable to this project development in the context of environmental management and conservation of biodiversity. The purpose of complying and conforming to the legal and other requirements is to:

- Protect the environment from being depleted and/ or degraded;
- Operate within the specified legal limits to avoid litigations and environmental liabilities/risks;
- Create a sustainable project that considers area development which is balanced with the social, economic, and ecological needs; and
- Create an understanding and commitment on the implementation of local, regional, and international environmental legal requirements.

There are a number of sectoral laws that fall under general public of environment laws. Sectoral laws are generally applicable to specific sectors such as forestry, water, mining and so forth. A number of Namibian legislation and policies have environmental consideration in respect of operations to be carried out in most development initiatives in Namibia as listed in table 1:

Table 1: Namibian legislation and policies relevant to the project

Laws	**Summary description/functions**	**Implications to the project**
The Nature Conservation Amendment Act, 1986 (No. 4 of 1975)	The Constitution is the supreme law in Namibia, providing for the establishment of the main organs of state (the Executive, the Legislative, and the Judiciary) as well as guaranteeing various fundamental rights and freedoms. Chapter 11, articl95 it entitled "promotion of the actively promote and maintain the welfare of the people by adopting, inter alia policies aimed at maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of living natural resources on a sustainable basis for all Namibians, both present and future; in particular, the government shall provide measures against the dumping or recycling of foreign nuclear waste on Namibian territory.	
Atmospheric Pollution	This ordinance provides for	Measures should be

Prevention Ordinance (No.11 of 1976)	the prevention of air pollution.	instituted to ensure that dust emanating from construction activities and operations is kept at acceptable levels.
Soil Conservation Act (No. 76 of 1969)	The Act makes provision for the prevention and control of soil erosion and the protection, improvement and conservation of soil, vegetation and water supply sources and resources, through directives declared by the Minister	Duty of care must be applied to soil conservation and management measures must be included in the EMP.
Public Health Act (No. 36 of 1919)	Section 119 states that "no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health."	The Proponent and all its employees should ensure compliance with the provisions of these legal instruments.
Forestry Act 12 of 2001 Ministry of Environment, Forestry and Tourism	The Act provides for the management and use of forests and related products / resources. It offers protection to any living tree, bush or shrub growing within 100m of a river, stream or watercourse. Should either of the above be unavoidable, it will be necessary to obtain a permit from the Ministry.	The Proponent should apply for permit to remove protected species from the nearest Forestry Office if need be.
Water Act 54 of 1956 Ministry of Agriculture, Water and Land Reform	The Act provides for the control, conservation and use of water for domestic, agricultural, urban and industrial purposes. In accordance with the Act, the proposed project must ensure that mechanisms are implemented to prevent water pollution.	The protection (both quality and quantity/abstraction) of water resources should be a priority throughout the project life cycle.
Water Resources Management Act (No 11 of 2013)	The Act provides for the management, protection, development, use and conservation of water resources; and provides for the regulation and monitoring of water services and to provide for incidental matters. The objects of this	

	Act are to: Ensure that the water resources of Namibia are managed, developed, used, conserved and protected in a manner consistent with, or conducive to, the fundamental principles set out in Section 66 - protection of aquifers, Subsection 1 (d) (iii) provide for preventing the contamination of the aquifer and water pollution control (Section 68)	
The Constitution of the Republic of Namibia (1990)	The articles 91(c) and 95(i) commits the state to actively promote and sustain environmental welfare of the nation by formulating and institutionalizing policies to accomplish the Sustainable objectives which include: • Guarding against overutilization of biological natural resources, • Limiting over-exploitation of non-renewable resources, • Ensuring ecosystem functionality, • Maintain biological diversity. The constitution further states that the State shall actively promote and maintain the welfare of the people by adopting policies that are aimed at maintaining ecosystems, essential ecological processes and the biological diversity of Namibia.	Through implementation of the Environmental Management plan the establishment will be in conformant to the constitution in terms of environmental management and sustainability. Ecological sustainability will be main priority for the proposed development.
Environmental Management Act EMA (No 7 of 2007) Ministry of Environment, Forestry and Tourism	The purpose of this Act is to give effect to article 95 (l) and 91 (l) of the Namibian Constitution by establishing general principles for the management of the environment and natural resources: to promote the coordinated and integrated management of the environment; to give statutory effect to Namibia's environmental assessment policy. Requires that projects with significant environmental	The EMA and its regulations should inform and guide this EA process. This document is compiled in a nature that project implementation is in line with the objectives of the EMA Act. Guiding procedures were also drawn from the act to facilitate for the carrying out of the EIA and drafting the EMP for the proposed development. All formal requirements as per the act will be duly identified and adhered to. The Project will follow this Act

	impacts are subject to an environmental assessment process (Section 27).	accordingly and consider all aspects inclusive of the assessment process and acquire environmental clearance.
Environmental Impact Assessment (EIA) Regulations GN 28-30 (GG 4878)	Details requirements for public consultation within a given environmental assessment process (GN 30 S21). Details the requirements for what should be included in a Scoping Report (GN 30 S8) and an Assessment Report (GN 30 S15). Requires that projects with significant environmental impact are subject to an environmental assessment process (Section 27). The Act aims at: • Promoting the sustainable management of the environment and the use of natural resources by establishing principles for decision-making on matters affecting the environment; • To provide for a process of assessment and control of projects which may have significant effects on the environment; • To provide for incidental matters.	
Road Traffic and Transport Act, No. 22 of 1999	The Act provides for the establishment of the Transportation Commission of Namibia; for the control of traffic on public roads, the licensing of drivers, the registration and licensing of vehicles, the control and regulation of road transport across Namibia's borders; and for matters incidental thereto.	Mitigation measures should be provided for, if the roads and traffic impact cannot be avoided. Should the Proponent wish to undertake activities involving road transportation or access onto existing roads, the relevant permits will be required from the Ministry of Works and Transport (Roads Authority).
National Heritage Act No. 27 of 2004. Ministry of Education, Arts and Culture	To provide for the protection and conservation of places and objects of heritage significance and the registration of such places and objects; to establish a National Heritage Council; to establish a National Heritage Register; and to provide for	The Proponent should ensure compliance with this Acts' requirement. The necessary management measures and related permitting requirements must be taken. This done by consulting with the National Heritage Council of Namibia.

	incidental matters. The Act enables the proclamation of national monuments and protects archaeological sites.	
Labour Act (No. 6 of 1992) as amended in the Labour Act, 2007 (Act No 11 of 2007) Ministry of Labour, Industrial relations and Employment Creation	Ministry of Labour is aimed at ensuring harmonious labour relations through promoting social justice, occupational health and safety and enhanced labour market services for the benefit of all Namibians. Chapter 5 of the Act improvises on the protection of employees from unfair labour practice.	The Proponent should ensure that the project activities do not compromise the safety and welfare of workers.
Hazardous Substance Ordinance (Ord. 14 of 1974) Ministry of Health and Social Services	The Hazardous Substances Ordinance deals with the selling, storing and using of hazardous materials. Under this Act, specific license must be obtained in order to purchase and store certain groups of hazardous substances. Safe storage of hazardous substances ensure that should any accident and/ or spillage occur; environmental risks are minimized. Provisions for hazardous waste are amended in this Act as it provides ' for the control of substances which may cause injury or ill health to or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitizing or flammable nature or the generation of pressure thereby in certain circumstances; to provide for the prohibition and control of such substance; and to provide for matters connected therewith.	The Proponent should ensure compliance with the provisions of this legal instruments.
The Minerals (Prospecting and Mining) Act (Act 33 of 1992)	This Act provides for the reconnaissance, prospecting and mining as well as disposal of, and the exercise of control over, minerals in Namibia; and to provide for mattes incidental thereto. Section 50(f)[9] makes provision for any mining or	The Proponent should ensure compliance with the provisions of this legal instruments.

	prospecting company to conduct an Environmental Impact Assessment (EIA) and if necessary to draft an Environmental Management Plan (EMP). The Mining Commissioner decides on the need for an EIA and/ or an EMP, as a requirement to obtain a mineral license, based on the information obtained from the mining or prospecting company in the application. According to section 91(f) the application by any person for a mining license should include particular of; (i) the condition of, and any existing damage to, the environment in the area to which the application relates (ii) an estimate of the effect which the proposed prospecting operations and mining operations may have on the environment and the proposed steps to be taken in order to minimize or prevent any such effect, and the manner in which it is intended to prevent pollution, to deal with any waste, to safeguard the mineral resources, to reclaim and rehabilitate land disturbed by way of the prospecting and mining operations, and to minimize the effect of such operations on land adjoining the mining	

	area.	
Mineral Policy of Namibia	The Policy provides guiding principles and direction while communicating the values of the Namibian people in pursuit of the development of the mining sector. The Policy also highlights the importance of developing the mining sector to ensure environmentally acceptability and includes consideration the health and safety of people.	The Proponent and all its employees should ensure compliance with the provisions of this legal instruments.

5. Description of the project area

Exclusive Prospecting License (EPL) 6217 is located in the Daures Constituency, Erongo Region. The EPL is situated about 8 km northeast of Uis and overlies the Tsiseb and Otjimboyo communal conservancies. The site is on a slightly disturbed 'desert ecosystem', that has been altered by other mining developments.

Figure 1: Project area

6. Field visits

During the site visits on the 20-21 February 2021, the different biodiversity features, habitat, vegetation, and landscape units present at the site were identified in the field. Walk and drive-through-surveys were conducted across the site and all plant and animal species observed were identified and recorded. Searches for listed and protected plant species at the site were conducted. Active searches for reptiles and amphibians were also conducted within habitats likely to harbor or be important for such species. The presence of sensitive habitats such as unique edaphic environments such as rocky outcrops were noted in the field.

7. Geology

The area is of great geological and environmental importance as it provides unique minerals and an ecosystem for different species. It has a blend of rocky mountains that are dominantly composed of different igneous rocks such as granite and dolerite, while the soil type is sandy with mild gravel plains.

8. Ecological sensitivity assessment

Ecological sensitivity refers to the reactions with which ecosystems cope with human interference and natural changes in the environment. These reactions indicate the difficulty and potential to solve ecological problems on the site. An ecological sensitivity evaluation is essentially a clear identification of environmental problems compared with the natural environment background.

An ecological sensitivity map of the site was produced by integrating the information collected on-site with the available ecological and biodiversity information in the literature and various spatial databases. This includes delineating the different vegetation and habitat units identified in the field and assigning sensitivity values to the units based on their ecological properties, values and the potential presence of species of conservation concern. The ecological sensitivity of the different units identified in the mapping procedure was rated according to the following scale:

- **Low** - Units with a low sensitivity where there is likely to be a negligible impact on ecological processes and terrestrial biodiversity. This category is reserved specifically for areas where the natural vegetation has already been transformed, usually for intensive agricultural purposes such as cropping. Most types of developments can proceed within these areas with little ecological impact.
- **Medium**- Areas of natural or previously transformed land where the impacts are likely to be largely local and the risk of secondary impact such as erosion low. Developments within these areas can proceed with relatively little ecological impact provided that appropriate mitigation measures are taken.
- **High** - Areas of natural or transformed land where a high impact is anticipated due to the high biodiversity value, sensitivity, or important ecological role of the area. Developments within these areas is highly undesirable and should only proceed with caution as it may not be possible to mitigate all impacts appropriately.
- **Very High** - Critical and unique habitats that serve as habitat for rare/endangered species or perform critical ecological roles. These areas are essentially no-go areas from a developmental perspective and should be avoided at all costs.

Figure 2 shows the sensitivity of the project area. Clearly, the project area is classified as moderate in terms of its botanical sensitivity to project activities.

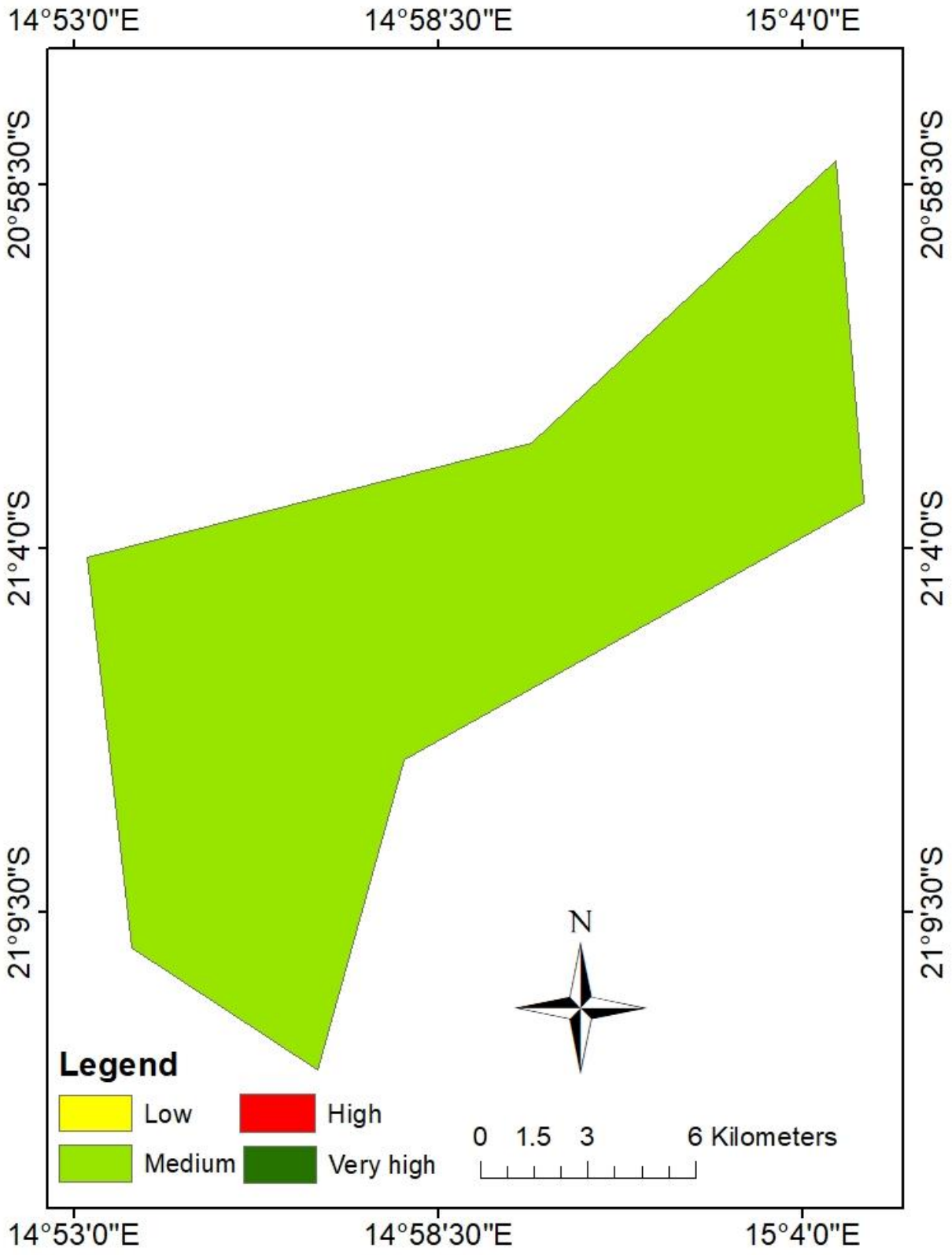

Figure 2: Sensitivity of the study area

9. Flora

In general, the area is part of Namibia's Central West eco-region. The average annual rainfall in the region is between 0 and 50 millimeters. Table 2 shows the vegetation that can be found in the project region.

Table 2: Plant species found in the study area

Scientific name	**Endemic**	**Protected**	**Near Endemic**	**Threatened**	**Least Concern**
Euphorbia damarana L.C. Leach			X		X
Euphorbia virosa Willd. subsp. *virosa*					X
Boscia albitrunca (Burch.) Gilg & Gilg-Ben.					
Zygophyllum stapffii Schinz	X				X
Albizia anthelmintica (A. Rich.) Brongn.					
Croton gratissimus Burch. var. gratissimus					
Moringa ovalifolia Dinter & A. Berger		X	X		X
Terminalia prunioides M.A. Lawson					
Commiphora saxicola Engl.	X				X
Commiphora wildii Merxm.					X
Maerua schinzii Pax					X
Acacia reficiens Wawra subsp. *reficiens*					
Acacia erubescens Welw. ex Oliv.					X
Acacia fleckii Schinz					X
Acacia luederitzii Engl. var. *luederitzii*					X
Commiphora virgata Engl.					X
Commiphora glaucescens Engl.			X		
Commiphora glandulosa Schinz					X
Commiphora tenuipetiolata Engl.					X
Lycium bosciifolium Schinz					
Parkinsonia africana Sond.					
Boscia foetida Schinz subsp. *foetida*					X

The most dominant species in the project area are *Parkinsonia africana*, *Commiphora glaucescens, Euphorbia damarana* and *Euphorbia virosa* (figure 3).

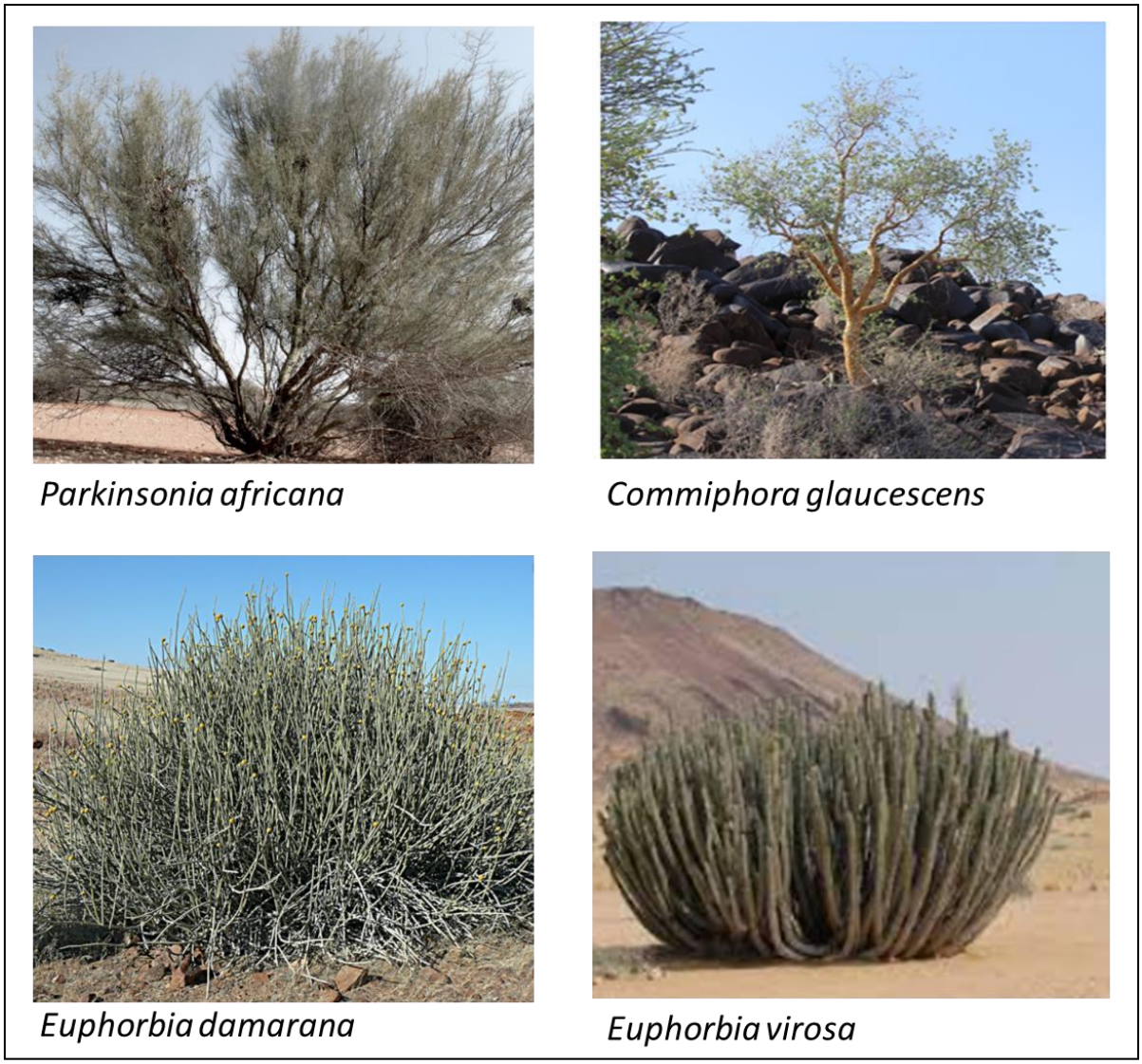

Figure 3: Selected species found in the project area

Moringa ovalifolia is the species which is widespread and locally common in some areas of the project (figure 4). It is, however, protected by a Nature Conservation Ordinance in Namibia.

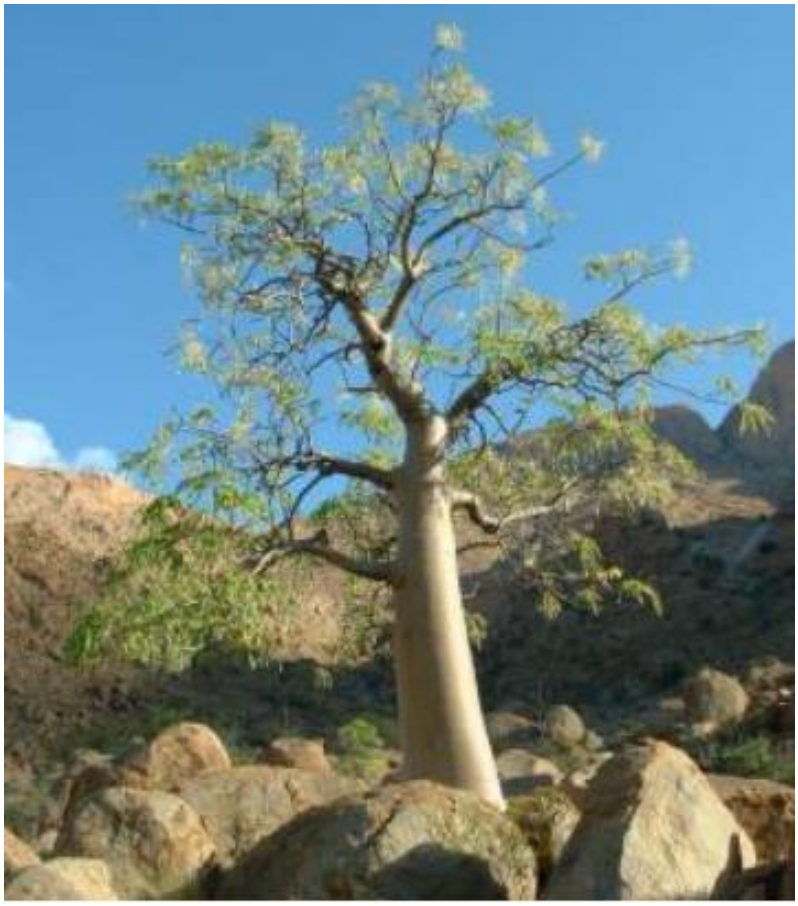

Figure 4: Protected tree species - *Moringa ovalifolia*

10. Fauna

The fauna which is found in the project area is shown in table 3.

Table 3: Fauna found in the study area

Scientific name	**Common name**
Antidorcas marsupialis	Springbok
Oryx gazella	Gemsbok/Oryx
Struthio camelus	Ostrich
Capra aegagrus hircus	Goats
Ovis aries	Sheep

Birds

Because of the diversity of habitats, including the desert proper, deeply incised valleys of the major ephemeral rivers and their tributaries, wetland habitats along the coast, and semi-arid terrain on the eastern edge, the Erongo region, especially the project area, have a very high diversity of birds.

Mammals

In comparison to wetter regions of Namibia and southern Africa, the project region has a relatively low diversity of mammals (Griffin 1998). Mammals, along with birds, are often the most visible and tourist-drawing species in any landscape.

Reptiles

Reptiles are common and diverse in Namibia, and their relative success in occupying and ecosystems makes them a significant feature of the Erongo region's biodiversity. The key threats posed by mining to the many small and secretive lizards and snakes that live in the region are habitat modification and degradation. Although the magnitude of these effects is not thought to be large enough to pose a danger to any of the animals.

Invertebrates

Invertebrates (such as scorpions, spiders, and other archinids, as well as insects) have the greatest diversity of species and endemism, and endemism in central-west Namibia is remarkably high (Irish 2009). Nonetheless, regional mining operations have a negligible effect on these species.

11. Environmental impacts on Flora

Unnecessary clearing of the existing vegetation may lead to loss of biodiversity on the site. Of note is that the flora that will be mostly impacted be those on found on the mountains as those are the areas targeted for exploration. Therefore, appropriate mitigation measures will need to be implemented in order to minimize the loss of biodiversity during the project phases. Without any mitigation measures, the impact is rated medium and with the implementation of recommended measures, the rating will significantly be reduced to low. The ecological sensitivity of the area is classified as medium, because of it contains few protected species and endemic species which are of least concern. In addition, the area is not prone to the degradation of ecosystem functions under natural and anthropogenic pressures.

Clearing for mine roads and related facilities would have the most direct effects on flora and plant populations. The fall of dust from the dust emissions may have an effect on the surrounding vegetation. Some loss of vegetation is an inevitable consequence of the development. As the abundance of some species such as *Parkinsonia africana*, *Commiphora glaucescens, Euphorbia damarana* and *Euphorbia virosa* is high, impacts on such species is potentially medium and the habitat loss for such species cannot be mitigated.

Soil disruption and the loss of plant cover in cleared and disturbed areas will increase the risk of erosion. The majority of the site is gently sloping, and if not properly managed, the additional runoff caused by cleared or hardened areas of the site will pose a significant erosion risk.

12. Environmental impacts on Fauna

The direct loss of ecosystems caused by land clearing and earthmoving activities is the primary effect of mining on fauna. It is worth noting that the flora found on the mountains will

be the ones most affected, as those are the areas targeted for exploration. Game animals, birds, and predators, all of which are mobile wildlife species, can leave these areas. Invertebrates, many snakes, burrowing rodents, and small mammals, which are more sedentary, may be more seriously affected.

Secondary impacts refer to activities that cause varying levels of disruption outside of the immediate mining area, such as access and haul roads and other facilities. The mine's blown-in dust can have an effect on nearby wildlife and human settlements.

Habitat fragmentation can be exacerbated by mine impacts, as well as other factors. This happens when vast areas of land are fragmented into smaller and smaller patches, making native species dispersal difficult or impossible between patches and cutting off migratory routes. Isolation can result in localized species decline or genetic effects such as inbreeding. Species that necessitate vast swaths of vegetation may disappear.

The area is not rich in terms of large mammals. The area has been heavily disturbed by artisanal miners making the whole area less likely to have the potential of hosting diverse fauna. Sensitive and shy fauna would move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed. The presence of hammocks with grasses provides a good habitat for a number of invertebrates. The site is expected to host diverse invertebrates which include the following Orders of insects: butterflies (Lepidoptera), spiders, scorpions (Arachnids), grasshoppers (Orthoptera), termites (Isoptera), ants, flies (Diptera), beetles (Coleoptera), dragonflies and mayflies (Odonata) and plant bugs (Hemiptera) and many others which can be identified if surveys are to be carried during the breeding wet season.

13. Proposed mitigation measures and recommendations

13.1 Flora

The following is a summary of the proposed mitigation measures that may be applied at the site:

- Design access roads appropriately in a manner that disturbs minimal land areas as possible.
- Make use of the existing road network as much as possible and avoid off-road driving.
- Vegetation clearing to be kept to a minimum. The vegetation of the site is largely low and open and therefore whole-sale vegetation clearing should only be applied where necessary and within the development footprint.
- The area contains *Moringa ovalifolia* which is a protected tree species. It is therefore important position drill holes and trenches away from areas where this species is occurring. This is because the loss of this species from the site cannot be fully mitigated as the habitat loss is permanent and it is not likely that all the individuals of listed species can be translocated.
- Collection of plants, or parts of plants (including seed and/or fuelwood) should be forbidden.
- Formulate and implement suitable and appropriate operational management guidelines for the cleared areas. Incorporated in the guidelines are the progressive rehabilitation measures. These should take into account: -

  - Post closure land-use measures and/or establishment of self-sustaining indigenous vegetation.
  - Erosion management measures,
- Vegetate the top surface of the cleared areas as soon as it is practicably possible with indigenous plants.
- Cleared areas should be revegetated with seed or plants of locally occurring species.
- Regular monitoring for alien plants within the development footprint during operations.
- No muddy and dirty equipment should be brought onto site as this is likely to carry seed of alien species.
- No litter or throwaway any waste on the site.
- The area contains endemic species as shown in table 1. These species are also listed as least concern. Therefore, whole-sale vegetation clearing should only be applied where necessary and within the development footprint. In addition, they could be relocated immediately, removed and stored for later replacement, or as a last resort offered to an indigenous nursery.

The following is a summary of recommendations:

It is recommended that an Environmental Clearance Certificate be issued for the proposed exploration and mining activities on mining claims EPL 6217, subject to the following recommendations:

- All required permits, licenses and approvals for the proposed activities should be obtained as required. These permits and licenses include borehole drilling on farms, water abstraction & use permits, land/farm access agreements to explore and mine, etc.
- The Proponent complies with the legal requirements governing this type of project and its associated activities.
- All the necessary environmental and social (occupational health and safety) precautions provided should be adhered to.
- Areas where exploration and mining activities have ceased should be rehabilitated, as far as practicable to a closer appearance like the pre-project state.
- It is therefore recommended that the Proponent and their contractors/employees effectively implement the recommended management plan actions (mitigation measures). Furthermore, to maintain medium sensitivity level, the implementation of measures will need to be continuously monitored by the Proponent.
- Monitoring will not only be carried out to maintain the medium rating of impacts' significance but to also ensure that all potential impacts identified in this study and other impacts that might arise during project implementation are properly identified in time and addressed.

13.2 Fauna

- Limit land clearing by using technologies and mining practices that minimize habitat disturbance.
- Use existing tracks – if roads are to be constructed, use existing corridors and build away from steep slopes.
- Capping or plugging of drill holes to prevent small mammals from becoming trapped.
- Enhance faunal corridors and habitats;

- Animals will usually colonise rehabilitated areas if the composition and structure of the rehabilitated vegetation are similar to surrounding areas. Methods for reintroducing missing habitat components include transplanting the vegetation; conserving and re-using vegetation by chipping or re-spreading it as mulch or branches to provide shelter for small invertebrates and reptiles, erosion protection and nutrients; constructing nest boxes to provide shelter and breeding habitat for many bird and mammal species; constructing reptile habitat by a limited distribution of surface boulders; and constructing perches used by raptors and other birds (which may introduce seeds).

14. Conclusion

Based on the afore-mentioned points, it can be concluded that that the proposed activities may be granted an Environmental Clearance Certificate. The ECC issuance will be on condition that the recommendations and impact mitigation measures in this report and all the provisions in the EMP are adhered to. Considering that the area falls within two legally registered communal conservancies (Tsiseb and Otjimboyo), there is a need to integrate rehabilitation efforts and the EMP of the area.

Specific threats to areas of importance for biodiversity may be identified through existing information about the site and by the incorporation of the key personnel from the two conservancies in the process of identifying and setting priorities for threats. This participatory approach ensures that the comprehensive information on threats is shared between two legally registered communal conservancies, who gain a common understanding of the main threats to devise effective mitigation strategies. The integration efforts should identify threats in specific terms, describe the impact on biodiversity and identify the underlying causes of the threat. This level of specificity is important to underpin the design of effective biodiversity management initiatives.

The effective implementation of the recommended management actions (mitigation measures) will see the significance reduction in impacts' significance (that cannot be avoided) from medium to low.

15. References

Griffin, M. 1998c. Mammals Diversity. In: Barnard, P. (ed). Biological diversity in Namibia: a country Study. Windhoek: Namibia national biodiversity Task force.

Irish, J. 2009. Conservation status of endemic central Namibia invertebrates. Unpublished report for Uranium province SEA, via SAIEA.