ENVIRONMENTAL MANAGEMENT PLAN FOR PROPOSED DEVELOPMENT OF A MARBLE MINE/QUARRY ON MINING LICENCE (ML218), KARIBIB, ERONGO REGION

Prepared by

CPI
Chem Papers Investments CC
CC/2010/4075

Chem Papers Investments cc
P.O. Box 31671, Windhoek,
Namibia
Tel: (+264)085 671 4750

Proponent:

Catseye Investments cc
P.O. Box 86041, Eros,
Windhoek, Namibia
+264 81 468 5578

DOCUMENT DATA SHEET

Title	**ENVIRONMENTAL MANAGEMENT PLAN FOR PROPOSED DEVELOPMENT OF A MARBLE MINE/QUARRY ON MINING LICENCE (ML218), KARIBIB, ERONGO REGION**		
Report Status	Draft		
Proponent	Catseye Investments CC P.O. Box 86041, Eros, Windhoek, Namibia Contact Person: Zhou Hao Contact Number:+264 81 468 5578 Email:lixuanfaith@yahoo.com		
Environmental Practitioner	Chem Papers Investment CC P.O. Box 31671, Pionierspark, Windhoek ,Namibia Contact Person: Ms Cristofina M .Kanyama Contact Number: (+264)085 671 4750/ +264 813161012 Email:chempaperscc@gmail.com		
MET Project No.	APP-003190		
Date of release	November 2021		
	Name	**Signature**	**Date**
Author	Cristofina M. Kanyama		

8. Environmental Management Plan (EMP)

8.1 Overview

8.1.1. Purpose of this Environmental Management Plan (EMP)

Environmental management plan (EMP) serves as a risk strategy that contains logical framework, monitoring programs, mitigation measures and management control. The aim of an Environmental Management plan (EMP) is to develop procedures to implement project's mitigation measures and monitoring requirements. An EMP ensures the community that the environmental management of the project is acceptable. As well as stipulating the roles and responsibilities of persons involved in the project. It further ensures that legal and policy requirements are well known and understood by the proponent, its employees and contractors and will be strictly enforced by its management team. Issues and concerns identified in the EIA will form a set of environmental specifications that will be implemented on site.

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

Furthermore, overall objectives of this EMP are:

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

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

8.1.2. Summary of the proposed activities

The proponent has applied for a mining licence (ML218) on exclusive prospecting licence (EPL 6118) in order to develop a marble quarry. Marble quarrying and ongoing exploration activities have potential impacts on the following:

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

8.1.3. Project Phases Covered in the EMP

The following phases are addressed in this EMP:

- **Construction phase:** The initial phase which entails construction of main and supporting mining infrastructures (Mine Development).
- **Operation and maintenance phase:** the phase during which the quarrying activities are carried out and maintenance of the site, related infrastructure, equipment and machinery is done.

- **The decommissioning phase** is the time during which the targeted dimension is depleted or of no longer economic value, leading to the cessation of the mining activities. During the operational phase and before decommissioning, the Proponent will need to put site rehabilitation measures in place. The decommissioning phase is followed by mine closure and aftercare

8.1.4 Legal Implications and obligations under the EMP

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

8.1.5 Environmental Management Principles

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

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

2. Health, Safety and Social Well Being

- ❖ Safeguard the health and safety of project personnel and the public against potential impacts of the project. This includes issues of road safety, precautions against natural dangers on site, and radiation hazards; and,

- ❖ Promote good relationships with the local authorities and their staff.

3. Biophysical Environment

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

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

Commitment and Accountability:

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

Competence

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

Risk Assessment, Prevention and Control

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

Performance and Evaluation

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

Stakeholder Consultation

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

Continual Improvement

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

Financial Provisions for Quarrying

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

8.2. Identified impacts, monitoring and proposed mitigation measures

8.2.1. Positive social-economic impacts

8.2.1.1. Job Creation

Local recruitment will be encouraged by the proponent with a target of at least 65% locals. This operation thus contributes to the alleviation of unemployment which is severe in the country. The establishment and operation of the quarry will create both direct and indirect jobs for at least minimum50 people .Employment on the new project will be attractive to the local workforce by virtue of the comparatively high wages offered, this will result in the local growth in the economy of Karibib constituency and surrounding areas.

Enhancement measures

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

8.2.1.2. Support to local retailers shop

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

8.2.1.4. Export taxes and VAT payments

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

8.2.1.5. Supply of raw materials

Supply of raw materials and processed materials to downstream industry for economic growth. In addition to construction, dimension stone is also needed for monumental, as the raw material for

sculpture and tombstones. This industry will also add local value addition for the processing of blocks (waste) that cannot be sold as complete blocks.

8.2.2. Impacts on bio-physical environment

8.2.2.1. Liquid waste: oil spillage and wastewater

Mitigation Measures to be enforced:

- Ensure adequate storage and handling of liquid waste, fuel, waste water as well as regular maintenance of plant equipment.
- Avail a spill response action plan in case of accident.
- Accessibility to spill prevention and response equipment, such equipment should be visible and accessible to all employees at any given time.
- Spills will be cleaned up immediately to the satisfaction of the Regional Manager by removing the spillage together with the polluted soil and by disposing of them at a recognized facility.
- Designated waste collection tanks should be available on-site and away from waterways, and such isolation should be maintained at all times.
- Storage of the hazardous substances in a bounded area,
- Refuel vehicles at a designated area that has a protective surface covering/geo-membrane lining and utilize drip trays for stationary plant.

8.2.2.2 Impacts on surface water

Mitigation Measures to be enforced:

- No dumping of waste products of any kind in or in close proximity to surface water bodies.
- Heavy mining vehicles should be kept out of any surface water bodies and the movement of vehicles should be limited where possible to the existing roads and tracks.

- Ensure that oil/ fuel spillages from vehicles transporting the stones and machinery are minimized and that where these occur, that they are appropriately dealt with.
- Drip trays must be placed underneath vehicles when not in use to contain all oil that might be leaking from these vehicles.
- In all areas where there is storage of hazardous substances (i.e. hydrocarbons), there will be containment of spillages on impermeable floors and bund walls that can contain 110%ofthevolume of the hazardous substances.
- All refueling and any maintenance of vehicles will take place on impermeable surfaces.
- Pollution will be prevented through basic infrastructure design and through maintenance of equipment.
- Spill kits will be readily available on site. Employees and/or contractors will be trained to use the spill kits to enable containment and remediation of pollution incidents.
- Environmental awareness for contractor and employees to be included during inductions
- Any spills will be contained and cleaned up immediately
- Non-toxic and biodegradable drilling lubricant will be used

8.2.2.3. Solid waste

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

Mitigation Measures to be enforced:

- Sufficient waste disposal sites should be established on-site were generated waste should be kept during ongoing exploration and operation period.
- The collected solid waste should be disposed of at Karibib Town Council solid waste disposal sites.

- For human waste, during the construction phase, the mobile toilet should be made available on-site for workers and once these facilities are full, the collected human waste should be disposed at the Town Council human waste disposal site.
- It is recommended that waste from the temporary toilets be pumped out and disposed of at the designated waste treatment site in Karibib.
- Mandatory waste segregated right at the source of waste generation. The collection of segregated waste would be made from the quarrying site and amenity areas.
- Reusable and recyclable waste will be disposed of by selling to scrap dealers and private contractors for resale.
- Non-degradable waste will be transferred to the municipal solid waste management system.
- Waste generated will be handled in accordance with the contract signed with the landowner. This shall include: waste should be separated and recycled / re-used where possible.
- Where waste management procedures do not exist, a procedure should be developed.
- Employees and contractors will be shown the importance of correct waste disposal as well as waste minimization and recycling.

8.2.2.4. Land and soil disturbance

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

Mitigation Measures to be enforced:

- The access road to the mining site must be established in consultation with the landowner and usage of existing roads shall be enforced.
- The design, construction, and location of access to main roads will be in accordance with the requirements laid down by the controlling authority.

- Land markings, vehicle tracks, trenches and excavations shall be restored to the original landform and, visual state as much as possible.
- In the case of dual or multiple uses of access roads by other users, arrangements for multiple responsibilities must be made with the other users. If not, the maintenance of access roads will be the responsibility of the holder of the mining licence (ML).

8.2.2.5. Biodiversity (fauna and flora)

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

Mitigation Measures to be enforced: **flora**

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

- Prevent the destruction of protected tree species.
- No open fires will be permitted on site.

Mitigation Measures to be enforced: **fauna**

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

Methods for monitoring:

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

8.2.2.6. Impacts of Alien invasive Plants

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

Mitigation Measures to be enforced:

- The site manager will ensure that debris is properly disposed of.

- Vehicle tyres inspections can be carried out although this may not be a practical mitigation measure.

- The proponent should implement an alien plants awareness campaign to educate and sensitize the employees and the local community on the menace of planting alien vegetation in the area.
- Eradicating alien plants by using an Area Management Plan

Methods for monitoring:

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

8.2.2.7. Air quality

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

Mitigation Measures to be enforced

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

Monitoring

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

8.2.2.8. Impacts on Archaeological Sites

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

Mitigation Measures to be enforced

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

Monitoring

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

8.2.2.9. Noise

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

Mitigation Measures to be enforced

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

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

commencing such activities.

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

8.2.2.10 Storm water and erosion Control

Mitigation Measures to be enforced

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

8.2.2.11 Topsoil disturbance

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

Mitigation Measures to be enforced

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

8.2.2.12 Visual negative impacts

Mitigation Measures to be enforced

- Negative visual effects can further be prevented through mitigations (i.e. keep existing trees, introduce tall indigenous trees).

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

8.2.2.13 Fire and Explosion Hazard

Mitigation Measures to be enforced

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

8.2.2.14 Health, safety and security

There are number of hazards associated with the movement of equipments and impact on dangerous parts of the equipment. The risk of an accident will be high if the dangerous parts are exposed and operators are poorly trained or supervised. This increases the possibility of injuries and the responsible manager must ensure that all staff members are briefed about the potential risks of injuries on site.

Mitigation Measures to be enforced:

- All vehicular equipment operators must have valid licence for that particular vehicle class.
- Personnel should not overnight at the mining site, except the security personnel.

- Ensure that all mining personnel are properly trained depending on the nature of their work.
- Provide for a first aid kit and a properly trained person to apply first aid when necessary.
- A wellness program should be initiated to raise awareness on health issues, especially the impact of sexually transmitted diseases as described above.
- Encourage HIV counseling and testing and facilitate access to Antiretroviral (ARV) medication
- Restrict unauthorized access to the mining claim site and implement access control measures.
- Clearly demarcate the mining claim site boundaries along with signage of "no unauthorized access".
- Clearly demarcate dangerous areas and no go areas on site.
- Staff and visitors to the mining claim site must be fully aware of all health and safety measures and emergency procedures.
- The contractor must comply with all applicable occupational health and safety requirements.
- The workforce should be provided with all necessary Personal Protective Equipment where appropriate.
- Emergency medical treatment should be available on site.

8.2.3. Negative Impacts on Socio-Economic

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

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

Mitigation Measures to be enforced:

- The population change can be mitigated by employing people from the local community and encouraging the contractors to employ local individuals.

- The perception of risks will be mitigated by putting up safety signs wherever possible and ensuring that all employees and visitors to the site undergo a safety induction course.

Methods for monitoring:

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

Environmental Management Plan, Organization and Implementation

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

- Site Foreman SF
- Site/mine Manager SM/MM
- Project manager PM
- Project Proponent PP
- Project Geologist PG
- Environmental Coordinator ENC
- Contractor C
- Geological Technician GT
- Project staff PS

Table 9 : Implementing of the negative impacts. All the mentioned impacts in the below table are scheduled for all the phases of the proposed project.

Objectives	**Indicators**	**Responsibility**

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

Table 10: Summary of Environmental Management Plan during construction, operation and decommissioning phases

Construction phase			
Environmental impacts	**Proposed mitigation measures**	**Responsibility**	**Monitoring plan**
Air pollution	• Regular maintenance of vehicles and equipments. • Sensitize workers and contractors. • Control speed and operation of construction vehicles. • Regular maintenance of vehicles, construction equipments and heavy machineries. • Sensitize workers and contractors. • Provide workers with dust masks.	C SM PM ENC	• Amount of dust produced. • Level of landscaping executed.
Noise pollution	• All noise sources should be removed from site or kept within reasonable level. • Work should only be carried out during day time (7 am to 5 pm) • Regular maintenance of vehicles, equipments	C GT SM ENC	• Amount of noise produced

	and heavy machinery. • Workers should be provided with personal hearing protection if working in a noisy environment.		

Solid waste	• Littering should be discouraged. • Any debris/litter should be collected by a waste collection company. • The site should have receptacles with bulk storage facilities at convenient points to prevent littering.	PM SM ENC	• Presence of dust bins/waste collection points.
Oil leaks and spills	• Contactor should have a sealed designated area where maintenance is carried out to prevent percolation of contaminants. • Oil products should be handled carefully. • Vehicles and equipments should be well maintained to prevent oil leaks.	C ENC SM	• Absence of oil spills and leaks on site.
First aid	• A well-stocked first aid kit shall be maintained by a qualified personnel.	PM	• Contents of the first aid kits.
Visual	• Environmental considerations will always be adhered to before clearing roads, trenching and excavation.	PM GT	• Employees to be trained on hoe to minimize visual impacts.
Archaeological sites	• Buffer zones will be created around the sites. • Adhere to practical guidelines provided by the responsible archaeologist to reduce archaeological impacts of quarrying activities. • All archaeological sites to be identified and protected before development commences.	PM ENC PP SM	• Register of all archaeological sites identified.
Occupational health and safety	• Provide personal protective equipments, train workers on personal safety, and how to handle equipments and machines. • A well-stocked first shall be maintained by qualified personnel. • Report any accidents/ incidences and treat and compensate affected workers. • Provide sufficient and suitable sanitary conveniences which should be kept clean.	C PM PP	• Workers using personal protective equipments. • Availability of a well-stocked first aid box. • Clean sanitary facilities.
Fauna	• Some habitat areas such as the river and tunnel outcrops will be avoided wherever possible. • A fauna survey will be conducted to determine	PM ENC PP SM	• Regular monitoring of any unusual signs of animal habitat.

	the effect of fragmented habitat to game species should the need arise. • No animals shall be killed, capture or harmed in any way. • No food stuff shall be left lying around as this will attract animals which may result in human-animal conflict.		
Alien invasive plants	• Ensure vehicles and equipment are clean of invasive plants and seeds. • Eradicating alien plants using area management plan. • Contain neighboring infestations and restrict movement of invasive plants from adjacent lands • Educating everyone on site on types of invasive plants.	PM ENC PP SM	• Regular monitoring of any signs of alien plants.
Loss of vegetation	• Environmental considerations will be adhered to at all times before clearing roads, trenching and excavating. • The movement of vehicles in riverbeds, rocky outcrops and vegetation sensitive area will be avoided. • The movement of vehicles will be restricted to certain tracks only.	PM ENC PP SM	• Warning signs on site • Restored vegetation

Operational Phase			
Environmental /Social Impact	**Proposed mitigation measures**	**Respon sibility**	**Monitoring plan**
Noise pollution	• All noise sources should be removed from site or kept within reasonable level. • Regular maintenance of vehicles, equipments, heavy machinery on regular basis. • Work should only be carried out only during day time (7am to 5pm). • Workers should be provided with personal hearing protection if working in noisy environment.	PM ENC PP SM MM C	• Amount of noise produced
Visual	• Environmental considerations will be adhered to at all times before clearing roads and excavations	PM, ENC GT	• Employees to be trained on how to minimize visual impacts

Fauna	• Some habitat areas will be avoided where possible. • A fauna survey will be conducted to determine the effects of fragmented habitat game species should the need arise. • No animal shall be kept, captured, killed or harmed in any way. • No food stuff will be left lying around as these will attract animals which may result in human-animal conflict.	PM ENC PP MM C	• Regular monitoring of unusual signs of animal habitat.
Alien invasive plants	• Ensure debris is properly disposed of. • Ensure vehicles and equipment are clean of invasive plants and seeds. • Contain neighboring infestations and restrict movement of invasive plants from adjacent lands • Educating everyone on site on types of invasive plants. Eradicating alien invasive plants by using an area management plan.	PM ENC PP MM C	• Regular monitoring of any signs of alien invasive plants
Loss of vegetation	• Environmental considerations will be adhered to at all times before clearing roads, trenching and excavations. • Paths and roads will be aligned to avoid root zones. • Permeable materials will be used where ever possible. • Movement of vehicles in riverbeds, rocky outcrops and vegetation sensitive areas will be avoided and restricted to certain tracks only.	PM ENC PP MM C	• Restored vegetation
Solid waste	• Minimize solid waste generated on site. • Debris should be collected by waste collection company. • Excavation waste should be reduced or backfilled.	PM C	• Amount of waste on site. • Availability of dust bins, waste collection point.

Oil leaks and spills	• Machinery should be well maintained to prevent oil leaks. • Contractors should have a designated area where maintenance is carried out and should be underlain by impermeable layer.	PM ENC PP MM C	• No observed/detected oil spills and leaks on site
Archaeological sites	• Buffer zones will be created around the sites. • Adhere to practical guidelines provided by an archaeologist to reduce archaeological impact of quarrying activities. • All archaeological sites to be identified and protected before further quarrying commences.	PM	• Up to date register of all archaeological sites identified in the vicinity.
First aid	• A well-stocked first aid kit shall be maintained by qualified personnel.	PM	• Contents of the first aid kit.
Fire preparedness	• Firefighting emergency response plan. • Ensure all firefighting equipments are always available regularly maintained, serviced and inspected. • Fire hazard signs and directions to emergency exit, route to follow and assembly point in case of any fire incidence.	PM	• Fire signs put up in strategic places. • Availability of well-maintained firefighting equipments.
Environmental health and safety	• Train workers on personal safety and disaster preparedness. • Provide sufficient and suitable sanitary conveniences which should be kept clean. • Conduct annual health and safety audits. • Report any accidents/incidences, treat and compensate affected workers. • A well-stocked first aid kit shall be maintained by qualified personnel.	PM	• Provide sanitary facilities. • Copies of annual audit.

Decommissioning phase			
Impacts	**Proposed mitigation measures**	**Responsibility**	**Monitoring plan/Indicator**
Noise and air pollution	• Personal hearing protection must be worn by workers in noisy section. • Regular maintenance of vehicles, equipments, heavy machinery on regular basis. • Workers should be provided with dust mask to wear at all times. • Decommissioning work can only be carried out during the day.	C PM	• Amount of noise and dust generated
Disturbed physical environment	• Undertake a complete a complete environmental restoration programme and introducing appropriate vegetation for ground stabilization.	PM	
Solid waste	• Solid waste should be collected by contracted waste collection company. • Excavation waste should be used or backfilled	C PM	• Amount of waste on site. • Presence of well-maintained receptacles and central collection point.
Occupational health and safety	• Train workers on personal safety and how to handle equipments and machines. • Provide personal protective equipments (PEE). • A well-stocked first aid kits shall be maintained by qualified personnel. • Demarcate area under decommissioning.	C PM	• Workers using protective equipments. • Availability of a first aid box.

8.3 Monitoring, reporting and corrective action

8.3.1 Monitoring of EMP

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

- Monitoring of project activities and actions to be undertaken by the Environmental Coordinator (ENC) appointed by the Contractor.
- The Environmental Coordinator (ENC) shall report all incidents and situations which have the potential of jeopardizing compliance of statutory provisions as well as provisions of this EMP to the Project Proponent.
- The Environmental Coordinator (ENC) shall take corrective prompt measures, adequate and long-lasting in addressing non-compliance activities or behavior.

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

8.3.2 Inspections and Audits

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

8.3.2.1 Internal Inspections/Audits

The following internal compliance monitoring programme will be implemented:

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

8.3.2.2 External Audits

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

8.3.3 Documentation

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

8.3.4 Reporting

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

8.3.5 Environmental management system framework

Environmental Management System (EMS) will be established and implemented by the proponent and their Contractors. This subchapter establishes the framework for the compilationofaprojectEMS.Theapplicablemanagerwillmaintainapaperbasedand/orelectronic system of all environmental management documentation. These will be divided into policy and performance standards &Enviro legal documentation.

Policy and Performance Standards

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

Enviro-Legal Documentation

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

Impact aspect register

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

8.3.6 Procedures and Method Statements

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

- Standard operating procedures for environmental action plan and management programme execution.
- Incident and emergency response procedures.
- Auditing, monitoring and reporting procedures, and
- Method statements for EMP compliance for ad hoc activities not directly addressed in the EMP action plans.

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

Register of roles and responsibilities

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

Site Map

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

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

Environmental management schedule

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

- Environmental risk assessment;
- Environmental management meetings;
- Soil handling, management and rehabilitation;
- Waste collection;
- Incident and emergency response equipment evaluations and maintenance
- Environmental training;

- Stakeholder engagement;
- Environmental inspections and
- Auditing , monitoring and reporting

8.3.7 Change Management

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

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

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

8.4 Environmental code of conduct

The Code of Conduct outlined in this section of the EMP applies to, subcontractors, visitors, permanent and temporal workers. Therefore, anybody within the boundaries of the project site must adhere to the Environmental Code of Conduct as outlined in this section of the EMP.
The Environmental Coordinator ENC will implement on-site environmental guidelines and has the authority to issue warnings as well as discipline any person who transgresses environmental rules and procedures. Persistent transgression of environmental rules will result in a disciplinary hearing and thereafter continued noncompliance behavior will result in permanent removal from the construction sites.

8.5 Site closure and rehabilitation

Introduction

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

8.5.1 Site closure and rehabilitation

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

- No roads are anticipated to be constructed to access the site; existing roads will be used as far as possible. Where access tracks have been developed in cases where there are no roads, these will be rehabilitated and closed as l part of normal closure actions.
- Rehabilitated area will be re-vegetated with the objective of creating a sustainable ecosystem. Vegetationestablishmentwillbeinlinewithaprojectarea'sindigenousvegetation.
- The recovered topsoil and subsoil should be utilized to reconstruct the original soil profile.
- All rehabilitated areas shall be considered no go areas and the environmental coordinator shall ensure that none of the staff members enters the area after rehabilitation.
- A site inspection will be held after completion of the mining process to determine the nature and scope of the rehabilitation work to be undertaken. The rehabilitation will be done to the satisfaction of both the proponent and METF.

8.5.2 Alternatives Considered

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

- **Preferred Alternative:** Closure or backfill of quarries and trenches with overburden removed during mining.

- **Alternative 2:** To leave trenches, quarries open, in-order to allow for groundwater recharge by surface run-off.

Preferred Alternative: Rehabilitation/ Backfill of boreholes

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

Advantages:

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

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

8.5.3 Closure Assumptions

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

The assumptions used to prepare this plan include the following:

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

8.5.4 Closure and Rehabilitation Activities

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

8.5.4.1 Infrastructure

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

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

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

8.5.4.2 Roads

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

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

8.6 Remediation of Contaminated Areas

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

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

8.6.1 Vegetation

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

8.6.2 Waste Management

Waste management activities will include:

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

9. Public Participation Process

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

10. Conclusion and recommendations

The above Environmental Management Plan, if properly implemented, will help to minimize adverse impacts on the environment. Where impacts occur, immediate action must be taken to reduce the escalation of effects associated with these impacts. The Environmental Management Plan should be used as an on-site reference document during all phases of the proposed project, and auditing should take place in order to determine compliance with the EMP for the proposed site. Parties responsible for transgression of the EMP should be held responsible for any remediation that may need to be undertaken. The EMP Consultants are confident that the potential negative impacts associated with the exploration activities on site can continue to be mitigated by effectively implementing the recommended management action measures and their monitoring.

This report covers the environmental assessment for the construction, operation, operation, ongoing monitoring and rehabilitation and decommissioning, closure and aftercare of the marble quarry and supporting infrastructure. It should be viewed as a framework for integrating mitigation measures and applicable legal tools to ensure both compliance and sustainability. It is therefore very important that the proponent provides adequate support for human and financial resources,

for the implementation of the proposed mitigations and effective environmental management during the planned exploration activities. The proponent must implement and adhere to all the provisions of the EMP report and environmental monitoring shall be implemented.

It is hereby recommended that proposed marble mining and exploration operations as well as the supporting infrastructure be granted an Environmental Clearance Certificate, provided that: All mitigations provided in this EMP should are implemented as stipulated and where required and emphasized, improvement should be effectively put in place. The proponent shall prepare address all the impacts identified as medium and high rated impacts. The Proponent and all their workers comply with the legal requirements governing this type of project and its associated activities. The proponent shall negotiate further Lease Agreements with the owners of any farms falling within the ML area.

11. References

Ashmole, I., &Motloung, M. (2008). Dimension stone: the latest trends in exploration and production technology. In *Proceedings of the International Conference on Surface Mining* (Vol. 5, No. 8).

Angotzi, G., Bramanti, L., Tavarini, D., Gragnani, M., Cassiodoro, L., Moriconi, L., ... & Bovenzi, M. (2005). World at work: Marble quarrying in Tuscany. *Occupational and environmental medicine*, *62*(6), 417-421

Careddu, N., Di Capua, G., &Siotto, G. (2019). Dimension stone industry should meet the fundamental values of geoethics. *Resources Policy*, *63*, 101468.

Careddu, N., & Siotto, G. (2011). Promoting ecological sustainable planning for natural stone quarrying. The case of the Orosei Marble Producing Area in Eastern Sardinia. *Resources Policy*, *36*(4), 304-314.

Bakhtavar, E. (2011). Parallel holes spacing for the extraction of dimension stones using expansive mortars. *Archives of Mining Sciences*, *56*(4), 621-628.

Barnard, P., 1998. *Biological diversity in Namibia - a country study,* Windhoek: Namibian National Biodiversity Task Force.

Brown, C. & Lawson, J., 1989. *Birds and electricity transmission lines in South WestAfrica/Namibia,* Windhoek: Madoqua.

Burke, A., 2003. *Floristic relationship between inselbergs and mountain habitats inthe Central Namib.,* s.l.: Dinteria.

Calcutt, V., 2001. *Introduction to Copper: Mining & Extraction,* s.l.: Copper Development Association.

Christian, C., 2005. *Spitzkoppe Lodge Proposal Final Report,* Windhoek: Eco Plan (Pty) Ltd.

Griffin, E., 1998. *Species richness and biogeography of non-acarine arachnids inNamibia,* Windhoek: Biodiversity and Conservation.

Kisters, A., 2008. *Introduction to the Damara Orogen,* Windhoek: Isotope Geology of Namibia. Levinson, O., 1983. *Diamonds in the Desert.* Cape Town: Tafelberg.

Marshall, T. & Baxter-Brown, R., 1995. Basic principles of alluvial diamond exploration. *Journal of Geochemical Exploration,* pp. 278-293.

Mendelsohn, J., Jarvis, A., Roberts, C. & Robertson, T., 2002. *Atlas of Namibia: aportrait of the land and its people,* Cape Town: David Philip.

Miller, R.M. 1983. The Pan-African Damara Orogen of S.W.A./Namibia. *Special Publication of the Geological Society of South Africa*, 11, 431-515.

Miller, R.M., 2008. Neoproterozoic and early Palaeozoic rocks of the Damara Orogen. In: Miller, R.M. (Ed.). The Geology of Namibia. Geological Survey of Namibia, Windhoek vol. 2, pp. 13-1–13-410.References.

Schneider, G. & Seeger, K., 1992. Copper. In: s.l.:The Mineral Resources of Namibia, pp. 2.3, 1-172.