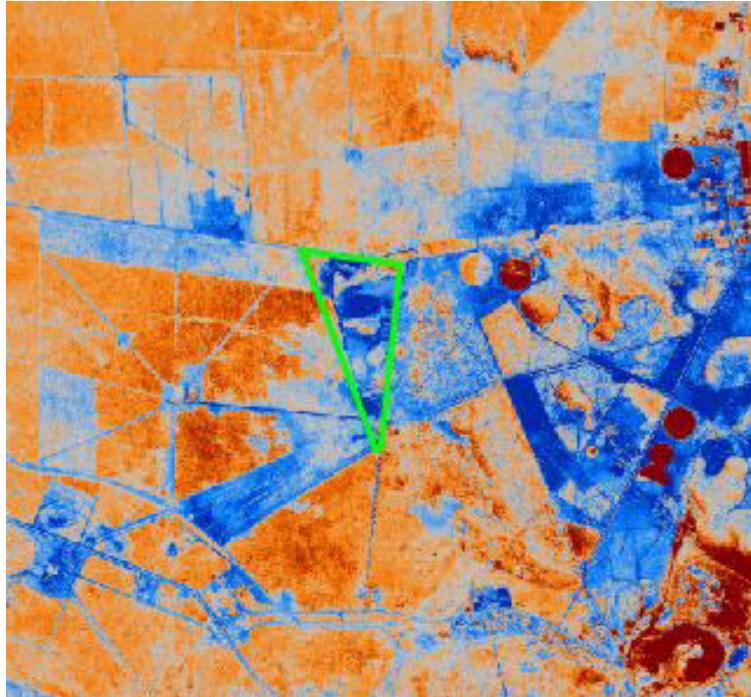


APP - 001709

**QUARRYING, CRUSHING AND SAND QUARRYING ACTIVITIES
OF HENNING CRUSHER, OSHIKOTO REGION
UPDATED ENVIRONMENTAL PLAN**



Assessed by:



Assessed for:

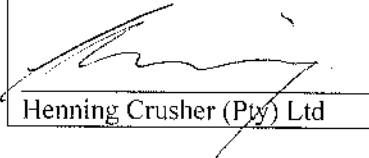
**Henning Crusher
(Pty) Ltd**

July 2023

Project:	QUARRYING, CRUSHING AND SAND QUARRYING ACTIVITIES OF HENNING CRUSHER, OSHIKOTO REGION: UPDATED ENVIRONMENTAL MANAGEMENT PLAN	
Report Version/Date	Final July 2023	
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Cite this document as:	Bosman Q, Strauss J. 2023 July; Quarrying, Crushing and Sand Quarrying Activities of Henning Crusher, Oshikoto Region: Updated Environmental Management Plan	
Report Approval		

I Tia Henning acting on behalf of Henning Crusher (Pty) Ltd hereby confirm that the project description contained in this report is a true reflection of the information which the Proponent provided to Geo Pollution Technologies. All material information in the possession of the Proponent that reasonably has or may have the potential of influencing any decision or the objectivity of this assessment is fairly represented in this report and the report is hereby approved.

Signed at Tsumeb on the 19th day of July 2023


Henning Crusher (Pty) Ltd

80/035
Company Registration

SUMMARY

Henning Crusher (Pty) Ltd conducts sand and dolomite quarrying activities on Portion 23 (Steinquelle) of Consolidated Farm Tsumore No. 761, close to Tsumeb in the Oshikoto Region. The operations provide sand and dolomite (crusher rock) to an on-site crusher. Material from the mine and the crusher is transported to markets across Namibia daily.

The updated EMP provides preventative and mitigation measures for all environmental, safety, health and socio-economic impacts associated with the operations of the facility. The document will be used to apply for renewal of the existing environmental clearance certificate (ECC-00767) for the sand mining, quarrying and crusher activities of Henning Crusher.

The quarry is situated in an area where surrounding land use is primarily agriculture. Due to the nature and location of the quarry, quarrying related impacts are expected on the surrounding environment. It is therefore recommended that environmental performance be monitored regularly to ensure regulatory compliance and that corrective measures be taken if necessary. The existing activities play a role in contributing to the construction industry. Major concerns of the operations relate to potential groundwater, surface water and soil contamination, ecological and social impacts. By appointing local employees and by implementing monitoring and training programs, the positive socio-economic impacts can be maximised while mitigating any negative impacts.

The updated EMP should be used as an on-site reference document during all phases (planning, operations and decommissioning) of the quarry and should be used in conjunction with a health, safety, environment and quality policy. Operators and responsible personnel must be taught the contents of these documents. Local or national regulations and guidelines must be adhered to and monitored regularly as outlined in the updated EMP. All monitoring and records kept should be included in a report to ensure compliance with the ECC conditions. Parties responsible for transgression of the EMP should be held responsible for any rehabilitation that may need to be undertaken.

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1 BACKGROUND & INTRODUCTION

Geo Pollution Technologies (Pty) Ltd was appointed by Henning Crusher (Pty) Ltd to undertake an environmental assessment for their quarrying and associated activities on Portion 23 (Steinquelle) of Consolidated Farm Tsumore No. 761 (Figure 1-1). Quarrying operations are located on the eastern portion of the property. Sand and dolomite resources are mined, where after the material is transported to an on-site crusher and processing facility. Once processed, material is loaded onto a rail system for transportation. Quarrying is conducted over approximately 110 ha of the farm.

The main operational activities include:

- ◆ Land clearing,
- ◆ sand stripping,
- ◆ sand washing (at washing plant),
- ◆ dolomite quarrying (blasting, loading and removal),
- ◆ dolomite crushing (primary and secondary at crusher plant),
- ◆ stockpiling washed sand and crushed dolomite, and
- ◆ loading washed sand and crushed dolomite for transportation.

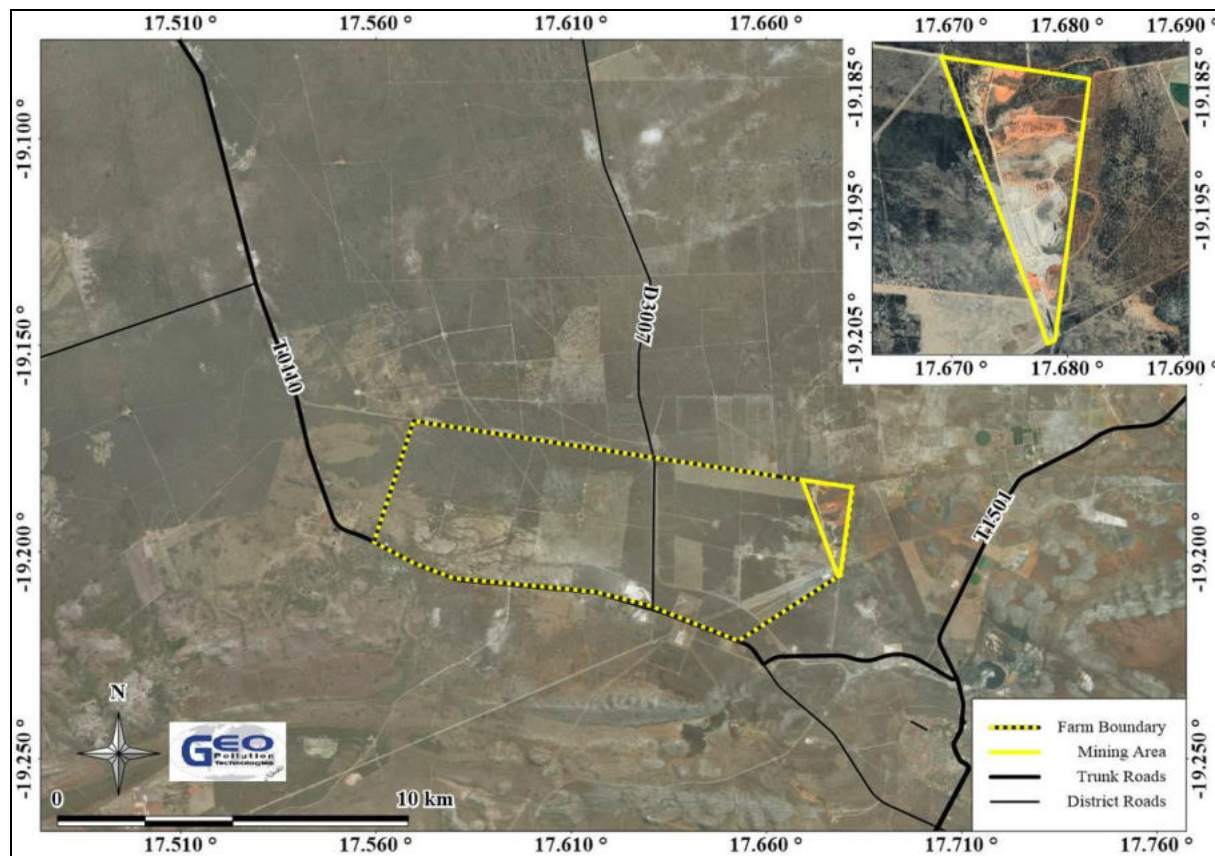


Figure 1-1 Location map

A brief risk assessment was undertaken in 2020 (Bosman et al. 2020) to determine the potential impacts of the operational and possible decommissioning phases of the facility on the environment. The environment being defined in the Environmental Management Act as “land, water and air; all organic and inorganic matter and living organisms as well as biological diversity; the interacting natural systems that include components referred to in sub-paragraphs, the human environment insofar as it represents archaeological, aesthetic, cultural, historic, economic, paleontological or social values”.

The assessment was conducted to prepare an EMP to apply for an environmental clearance certificate in compliance with Namibia’s Environmental Management Act (Act No 7 of 2007) (EMA).

Project Justification – As per Vision 2030 and all the related National Development Plans, it is the intention of the Namibian Government to sustainably develop natural resources. Through value addition of natural resources, various sectors within the economy may be positively affected. Henning Crusher, as the Oshikoto Region’s largest crusher stone supplier, has brought local investment into the Oshikoto Region. Value addition activities of the mined material include crusher activities and a brickfield which is provided with the material (in close vicinity to the mine). Crusher dust is also utilised in making tile grout at a nearby facility.

The mined area has been a source of construction material for the current crushing plant and nearby brick making operations for the construction industry in Tsumeb for over 50 years. Today, aggregate is mined and supplied to the construction industry all over Namibia, as the particular dolomite crusher stone is a sought after product.

Potential direct benefits:

- ◆ Reliable and secure supply of construction material for the local, regional and national construction industry,
- ◆ skills development of the employees,
- ◆ employment,
- ◆ increased economic resilience of direct employees,
- ◆ economic resilience in the area through diversification of business activities,
- ◆ economic growth and development of Tsumeb and surrounding areas,
- ◆ generation of income contributing to the national treasury, and
- ◆ sustaining employment in secondary industries (brick making and construction).

2 SCOPE OF THE EMP

The scope for the preparation of the updated EMP is:

1. To update the potential environmental impacts emanating from the operational and possible decommissioning activities of the mining and quarrying facility,
2. To update existing and identify new management actions which could mitigate the potential adverse impacts to acceptable levels,
3. Comply with the requirements of EMA,
4. Provide sufficient information to the relevant competent authority and the Ministry of Environment, Forestry and Tourism (MEFT) to make an informed decision regarding the renewal of the ECC for the operations and possible decommissioning of the facility.

3 METHODOLOGY

The following methods were used to update the EMP investigate the potential impacts on the social and natural environment due to the construction and operations of the facility:

1. Baseline information about the site and its surroundings was updated using secondary information.
2. Potential environmental impacts emanating from the operations and decommissioning of the facility were updated, as were possible enhancement measures for positive impacts and mitigation / preventative measures for negative impacts.
3. The updated EMP was prepared to be submitted to the MEFT.

4 ADMINISTRATIVE, LEGAL AND POLICY REQUIREMENTS

To protect the environment and achieve sustainable development, all projects, plans, programmes and policies deemed to have adverse impacts on the environment require an environmental assessment, as per the Namibian legislation. The legislation and standards provided in Table 1-1 to Table 1-3 govern the environmental assessment process in Namibia and/or are relevant to the development.

Table 1-1 Namibian law applicable to the project

Law	Key Aspects
The Namibian Constitution	<ul style="list-style-type: none"> ◆ Promote the welfare of people ◆ Incorporates a high level of environmental protection ◆ Incorporates international agreements as part of Namibian law
Environmental Management Act Act No. 7 of 2007, Government Notice No. 232 of 2007	<ul style="list-style-type: none"> ◆ Defines the environment ◆ Promote sustainable management of the environment and the use of natural resources ◆ Provide a process of assessment and control of activities with possible significant effects on the environment
Environmental Management Act Regulations Government Notice No. 28-30 of 2012	<ul style="list-style-type: none"> ◆ Commencement of the Environmental Management Act ◆ List activities that requires an environmental clearance certificate ◆ Provide Environmental Impact Assessment Regulations
Soil Conservation Act Act No. 76 of 1969	<ul style="list-style-type: none"> ◆ Provides for combating and prevention of soil erosion, the conservation, improvement and manner of use of the soil and vegetation and the protection of the water sources
Petroleum Products and Energy Act Act No. 13 of 1990, Government Notice No. 45 of 1990	<ul style="list-style-type: none"> ◆ Regulates petroleum industry ◆ Makes provision for impact assessment ◆ Petroleum Products Regulations (Government Notice No. 155 of 2000) <ul style="list-style-type: none"> ○ Prescribes South African National Standards (SANS) or equivalents for construction, operation and decommissioning of petroleum facilities (refer to Government Notice No. 21 of 2002)
The Water Act Act No. 54 of 1956	<ul style="list-style-type: none"> ◆ Remains in force until the new Water Resources Management Act comes into force ◆ Defines the interests of the state in protecting water resources ◆ Controls water abstraction and the disposal of effluent ◆ Numerous amendments
Water Resources Management Act Act No. 11 of 2013	<ul style="list-style-type: none"> ◆ Provide for management, protection, development, use and conservation of water resources ◆ Prevention of water pollution and assignment of liability ◆ Not in force yet
Forest Act (Act 12 of 2001, Government Notice No. 248 of 2001)	<ul style="list-style-type: none"> ◆ Makes provision for the protection of the environment and the control and management of forest fires ◆ Provides the licencing and permit conditions for the removal of woody and other vegetation as well as the disturbance and removal of soil from forested areas

Law	Key Aspects
Forest Regulations: Forest Act, 2001 Government Notice No. 170 of 2015	<ul style="list-style-type: none"> ◆ Declares protected trees or plants ◆ Issuing of permits to remove protected tree and plant species
Local Authorities Act Act No. 23 of 1992, Government Notice No. 116 of 1992	<ul style="list-style-type: none"> ◆ Define the powers, duties and functions of local authority councils ◆ Regulates discharges into sewers
Public and Environmental Health Act Act No. 1 of 2015, Government Notice No. 86 of 2015	<ul style="list-style-type: none"> ◆ Provides a framework for a structured more uniform public and environmental health system, and for incidental matters ◆ Deals with Integrated Waste Management including waste collection disposal and recycling; waste generation and storage; and sanitation.
Labour Act Act No 11 of 2007, Government Notice No. 236 of 2007	<ul style="list-style-type: none"> ◆ Provides for Labour Law and the protection and safety of employees ◆ Labour Act, 1992: Regulations relating to the health and safety of employees at work (Government Notice No. 156 of 1997)
Atmospheric Pollution Prevention Ordinance Ordinance No. 11 of 1976	<ul style="list-style-type: none"> ◆ Governs the control of noxious or offensive gases ◆ Prohibits scheduled process without a registration certificate in a controlled area ◆ Requires best practical means for preventing or reducing the escape into the atmosphere of noxious or offensive gases produced by the scheduled process
Hazardous Substances Ordinance Ordinance No. 14 of 1974	<ul style="list-style-type: none"> ◆ Applies to the manufacture, sale, use, disposal and dumping of hazardous substances as well as their import and export ◆ Aims to prevent hazardous substances from causing injury, ill-health or the death of human beings
Pollution Control and Waste Management Bill (draft document)	<ul style="list-style-type: none"> ◆ Not in force yet ◆ Provides for prevention and control of pollution and waste ◆ Provides for procedures to be followed for licence applications

Table 1-2 Relevant multilateral environmental agreements for Namibia and the development

Agreement	Key Aspects
Stockholm Declaration on the Human Environment, Stockholm 1972.	<ul style="list-style-type: none"> 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
United Nations Framework Convention on Climate Change (UNFCCC)	<ul style="list-style-type: none"> The Convention recognises that developing countries should be accorded appropriate assistance to enable them to fulfil the terms of the Convention
Convention on Biological Diversity, Rio de Janeiro, 1992	<ul style="list-style-type: none"> Under article 14 of The Convention, EIAs must be conducted for projects that may negatively affect biological diversity
International Treaty on Plant Genetic Resources for Food and Agriculture, 2001	<ul style="list-style-type: none"> Promote conservation, exploration, collection, characterization, evaluation and documentation of plant genetic resources for food and agriculture Promote the sustainable use of plant genetic resources for food and agriculture

Table 1-3 Standards or codes of practise

Standard or Code	Key Aspects
South African National Standards (SANS)* *Not currently applicable since no fuel storage occur on site.	<ul style="list-style-type: none"> The Petroleum Products and Energy Act prescribes SANS standards for the construction, operations and demolition of petroleum facilities SANS 10089-3:2010 is specifically aimed at storage and distribution of petroleum products at fuel retail facilities and consumer installations SANS 10131: 2004 aimed at above-ground storage tanks for petroleum products Provide requirements for spill control infrastructure

Quarrying and related activities that are listed as activities requiring an environmental clearance certificate are (Government Notice No. 29 of 2012):

Mining and Quarrying Activities

- 3.2. Other forms of mining or extraction of any natural resource whether regulated by a law or not - Quarrying is a type of extraction method employed for sand and stone resources.
- 3.3. Resource extraction, manipulation, conservation and related activities. - Quarrying is a type of extraction method employed for sand and stone resources.

Water Resource Development

- 8. The abstraction of ground water for industrial or commercial purposes - Ground water is abstracted for the use in value addition activities of sand washing as well as for ancillary works in terms of dust suppression. Washed sand is sold as part of commercial commodities.

Hazardous Substance Treatment, Handling and Storage.

- 9.1. The manufacturing, storage, handing or processing of a hazardous substance defined in the Hazardous Substances Ordinance 1974 - Diesel and petrol are defined as hazardous substances in the Labour Act. The Proponent has an above ground storage tank for the containment of 23m³ litre of diesel.
- 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 cubic metres at any location – The Proponent has installed infrastructure which is able to store petrol and diesel. These storage vessels are however not in use, but are maintained on the project area for possible future use. Although no active storage is conducted, the environmental management plan incorporated mitigation and preventative measures to be employed should fuel storage be commissioned.

Additional national planning legislation considered include:

- ◆ 5th National Development Plan (NDP5),
- ◆ Harambee Prosperity Plan.

The Harambee Prosperity Plan (HPP) is a targeted action plan to accelerate development in clearly defined priority areas, which lay the basis for attaining prosperity in Namibia. The Plan does not replace, but complements the long-term goal of the National Development Plans (NDPs) and Vision 2030. The rationale behind the HPP is to introduce an element of flexibility in the Namibian planning system by fast tracking development in areas where progress is insufficient. It also incorporates new development opportunities and aims to address challenges that have emerged after the formulation of NDPs. It is the purpose of NDP5 to set out a roadmap for achieving envisioned rapid industrialization while adhering to the four integrated pillars of sustainable development as identified in the plan. It is assumed that the NDP6 which is in development will build on these pillars.

The first goal of the economic progression pillar of NDP5 is to achieve sustainable and equitable economic growth. NDP5 further aims at intensifying value addition as part of its mining strategies and to promote industries that will produce mining inputs and services. Operations of Henning Crusher are in line with all of these strategies as identified in the NDP5. The project, by supplying essential material to clients, also support the focus area of sustainable infrastructure, namely, transport and logistics which also features as a key development goal in NDP5.

5 ENVIRONMENTAL CHARACTERISTICS

This section lists pertinent environmental characteristics of the study area and provides a statement on the potential environmental impacts on each. It also lists environmental features which may impact proposed operations.

5.1 LOCALITY AND SURROUNDING LAND USE

Farm Steinquelle FMB/00761/00023 (19.2008 °S; 17.6530°E) is located approximately 5 km northwest of Tsumeb along the B1 trunk road leading to Ondangwa. Adjacent properties are farms largely associated with agriculture. A NamPower substation is situated opposite the B1 trunk road, neighbouring the farm. The adjacent farms are listed in Table 1-4.

Table 1-4 Adjacent farms

Number on Map	Direction from Steinquelle FMB/00761/00023	Farm Name and Number
1	North	Pasadena FMB/00477
2	Northeast	Dannenberg FMB/00478
3	East	Skadu FMB/00761/00020
4	East	Tsumore FMB/00761/00REM

5.2 CLIMATE

The Tsumeb area is situated in a semi-arid climatic region. Days are mostly warm with very hot days during the summer months, while nights are generally cool. Rainfall occurs from October to April. The highest rainfall is normally received during the months of January, February and March. Average annual rainfall received in Tsumeb is high when compared to the rest of Namibia. Rainfall ranges between 450 and 500 mm/a, with a rainfall variability of 30%. The average annual evaporation exceeds 2,800 mm/a. Table 1-5 below contain a summary of climate conditions for the area.

Table 1-5 Summary climate data

Precipitation	450-500
Variation in annual rainfall (%)	< 30
Average annual evaporation (mm/a)	2,800-3,000
Water deficit (mm/a)	1,501-1,700
Temperature (°C)	20-21

5.3 TOPOGRAPHY AND SURFACE WATER

The landscape of the project area is characterised as the Karstveld landscape with surface cover consisting of undifferentiated sediments of the Kalahari Group or more recent deposits. The general area is mostly flat while undifferentiated rocky hills and inselberg mountains occur on site. The subsurface geology that outcrop on the farm is part of the Otavi Mountain Land massif. The mountain range comprise hills that rise up to 500 m above the surrounding plains with major east-west trending valleys characterized by relatively flat valley bases. The development of sinkholes, dolines and caves occur in the greater area.

5.4 GEOLOGY AND HYDROGEOLOGY

The project area consist of geology from the Quaternary-, Tertiary- and Namibian Age. The geology from the Quaternary and Tertiary Ages consist of the Kalahari Group deposits which typically are sand, calcrete and gravel. The Kalahari Group sediments accumulated and evolved through fluvio-deltaic, aeolian and groundwater processes. Undifferentiated sediments related to the Kalahari Group make up the surface cover of the project area and overlie the older Namibian Age Geology. Namibian Age geology comprises locally of rocks from the Otavi Subgroup of the Damara Sequence.

According to DWAF (2006) the project area falls inside a water control area known as the Tsumeb-Otavi-Grootfontein Subterranean Water Control Area, Government Notice 1969 of 13 November 1970 and Proclamation 278 of 31 December 1976 (Extension). The project area also falls under a sub-division of the water control area known as the Western Half of the Tsumeb-Abenab Synclinorium Sub-Catchment. This means that Government controls groundwater usage in this area i.e. drilling of boreholes, cleaning or deepening of boreholes and rates of water abstraction. All groundwater remains property of the Government of Namibia.

5.5 PUBLIC WATER SUPPLY

Water is supplied to Tsumeb by the municipality from boreholes roughly grouped in three areas: Extension 8, Nomtsoub and Extensions 6 and 7. The boreholes in the Nomtsoub Group have the highest yields. The majority of farms surrounding the projects area rely on boreholes installed on the farms as well as Lake Otjikoto for water supply. Quarrying operations are supplied by on-site boreholes. These are not located in close proximity to the supply boreholes of the municipality.

5.6 FAUNA AND FLORA

The farm falls within the Savanna Biome with a Karstveld vegetation and Woodland structure. Namibia's biodiversity pattern is characterised by low species diversity, but high endemism, in the west while high species diversity, but low levels of endemism, is present in the central north and the northeast. Plant and animal diversity on Farm Steinquelle would thus be expected to be relatively high in undisturbed areas, but with low endemism. Although the site is mainly void of natural vegetation, remaining vegetative pockets comprise mostly invader bush species and is less than 10 ha.

5.7 DEMOGRAPHIC CHARACTERISTICS

The project area falls within the Oshikoto Region with a population of 181,973 and a density of approximately 4.7 people per km² (National Planning Commission, 2012). Henning Crusher currently employs about 110 permanent staff. Secondary operations, which are sustained by the quarry further supports about 40 more permanent positions. Temporary employment is required from time to time and is usually about 10 people. Therefore, the operations contribute a significant portion to employment and related economic aspects.

6 ENVIRONMENTAL MANGEMENT PLAN

The EMP provides management options to ensure impacts of the facility are minimised. An EMP is a tool used to take pro-active action by addressing potential problems before they occur. This should limit the corrective measures needed, although additional mitigation measures might be included if necessary. The environmental management measures are provided in the tables and descriptions below. These management measures should be adhered to during the various phases of the operations of the facility. All personnel taking part in the operations of the facility should be made aware of the contents in this section, so as to plan the operations accordingly and in an environmentally sound manner.

The objectives of the EMP are:

- ◆ to include all components of operations of the quarry;
- ◆ to prescribe the best practicable control methods to lessen the environmental impacts associated with the project;
- ◆ to monitor and audit the performance of operational personnel in applying such controls; and
- ◆ to ensure that appropriate environmental training is provided to responsible operational personnel.

Various potential and definite impacts will emanate from the operations and possible future decommissioning phases. The majority of these impacts can be mitigated or prevented. The impacts with prevention and mitigation measures are listed below. Impacts related to the operational phase are expected to mostly be of medium to low significance and can mostly be mitigated to have a low significance. The extent of impacts are mostly site specific to local and are not of a permanent nature. Due to the nature of the surrounding areas, cumulative impacts are possible and include groundwater contamination and traffic impacts.

6.1 PLANNING PHASE

Although operations have been ongoing, extraction of future resource areas are still being planned and therefore the planning phase is still applicable. However, the impacts expected as being generated during the planning phase (which is inclusive of the acquiring of the ECC) relate mostly to legal, planning and economic aspects.

During the phases of planning for future operations, construction and decommissioning of the quarry, it is the responsibility of the Proponent to ensure they are and remain compliant with all legal requirements. The Proponent must also ensure that all required management measures are in place prior to and during all phases, to ensure potential impacts and risks are minimised. The following actions are recommended for the planning phase and should continue during various other phases of the project:

Ensure that all necessary permits from the various ministries, local authorities and any other bodies that governs the construction (maintenance) activities and operations of the project remains valid.

- ◆ Ensure all appointed contractors and employees enter into an agreement which includes the EMP. Ensure that the contents of the EMP are understood by the contractors, sub-contractors, employees and all personnel present or who will be present on site.
- ◆ Make provisions to have a Health, Safety and Environmental Coordinator to implement the EMP and oversee occupational health and safety as well as general environmental related compliance at the site.
- ◆ Have the following emergency plans, equipment and personnel on site where reasonable to deal with all potential emergencies:
 - Risk management / mitigation / EMP/ Emergency Response Plan and HSE Manuals
 - Adequate protection and indemnity insurance cover for incidents;
 - Comply with the provisions of all relevant safety standards;
 - Procedures, equipment and materials required for emergencies.
- ◆ If one has not already been established, establish and maintain a fund for future ecological restoration of the quarry. Should project activities cease and the quarry decommissioned, environmental restoration or pollution remediation may be required.
- ◆ Establish and / or maintain a reporting system to report on aspects of construction activities, operations and decommissioning as outlined in the EMP.
- ◆ Submit monitoring reports every six months to allow for future environmental clearance certificate renewal application.
- ◆ Appoint an environmental consultant to update the EA and EMP and apply for renewal of the environmental clearance certificate prior to expiry. Bi-annual monitoring report will be required by the Ministry of Environment, Forestry and Tourism for the renewal of the ECC.

6.1.1 Developing Project Feasibility & Permitting

Continual development of the project feasibility could have various impacts on the social, political and economic spheres of the environment. The acquisition of various permits for the operations generates information and directs planning initiatives. Permit requirements and acquisition further requires certain activities to be performed and related capital expenditure. Therefore planning activities contribute to diversification of the revenue flow generated through the project.

Project feasibility and related permit requirements may include preparation for restoration and rehabilitation funds, required to ensure a safe environment once quarrying activities are completed. Such a fund should serve to also address rehabilitation concerns should quarrying activities be abandoned for any reason. In terms of international best practise, such funds are usually kept separate from the operational costs and are grown through dedicated funds allocate monthly thereto. Funds could be related to the tonnage of material produced. For example for each ton material produced, an x amount or percentage is allocated to the restoration fund. Numerous models for determining rehabilitation costs have been developed internationally. The impact of development of such a fund is mostly related to the economic sphere of the environment.

Infrastructure maintenance on a local and regional scale, such as roads and railway line maintenance, may further have a potential impact on the feasibility of the project. Product movement will be hampered if infrastructure is not maintained. Continual communication with the related authorities should be maintained and included in regional planning aspects. Maintenance of the infrastructure will enable the project to continue contributing to the National Development Goals of 2030.

Desired Outcome: To contribute to the sustainable development of natural resources through interactive planning and partnership with authorities, neighbours and related industry.

Actions

Enhancement:

- ◆ Namibian companies to assist in permit acquisition.
- ◆ Record all activities related to permit acquisition, conducted.
- ◆ Facilitate information sharing, with the public and authorities.
- ◆ Maintain communication and interaction with key parastatals and ministries such as TransNamib, CENORED, Roads Authority, Ministry of Environment, Forestry and Tourism, Ministry of Agriculture, Water and Land Reform and Tsumeb Town Council.
- ◆ Calculate rehabilitation costs and update these as quarrying activities progress.
- ◆ Consider the establishment of a rehabilitation or insurance fund to provide for rehabilitation works.

Responsible Body:

- ◆ Proponent
- ◆ Contractors / Consultants

Data Sources and Monitoring:

- ◆ Record should be kept of all communication with neighbours or members of the community.
- ◆ Record should be kept of all communication with all authorities, parastatals and ministries.
- ◆ Records of expected rehabilitation costs kept.

6.1.2 Plans and Aspirations for the Future of the Affected or Surrounding Community

Planned quarrying operations, such as blasting events and deviations to operations, should be communicated to employees, neighbours and affected parties. Similarly any significant reduction in operations should be communicated to such parties. This will contribute to a sustainable relationship between the Proponent and the local community. Although community engagement will remain mainly on a local scale, engagement with various governmental agencies such as Ministry of Agriculture, Water and Land Reform and TransNamib will raise the level of engagement up to a regional level. When clear communication is achieved between all parties, aspirations and plans for future development may be much more defined, realistic and achievable.

Desired Outcome: To contribute to positive and sustainable community cohesion and contribute to realistic and achievable development.

Actions

Enhancement:

- ◆ Appoint a community liaison officer who will be responsible to communicate with neighbours and affected parties.
- ◆ Record all communication made with neighbours and affected parties regarding operational events such as blasting or operational deviations.
- ◆ Communicate timeously (well in advance) to all employees, any reduction in operations or any matters relating to or affecting employment security.
- ◆ Facilitate information sharing regarding any major pollution or contamination event, with the neighbours and authorities.
- ◆ Maintain communication and interaction with key parastatals and ministries such as TransNamib, CENORED, Roads Authority, Ministry of Environment, Forestry and Tourism, Ministry of Agriculture, Water and Land Reform and Tsumeb Town Council.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Record should be kept of all communication with neighbours or members of the community.
- ◆ Record should be kept of all communication with all authorities, parastatals and ministries.

6.1.3 Skills, Technology and Development

During various phases of the project, training has been and will be provided to a portion of the workforce. Training is conducted to enhance efficiency within different components of the quarry and value addition activities. Skills are further transferred to the unskilled workforce for general tasks. The technology employed for operations are in some instances new to the local industry, aiding in operational efficiency. Improvement of people and technology are key to economic development as well as operational feasibility. All employees will receive emergency and evacuation plan training while the supervisors and identified employees will have fire-fighting and first-aid training.

Desired Outcome: To see an increase in skills of local Namibians, as well as development and technology advancements in the industry.

Actions

Enhancement:

- ◆ If the skills exist locally, contractors must first be sourced from the town, then the region and then nationally. Deviations from this practice must be justified.
- ◆ Skills development and improvement programs to be made available as identified during performance assessments.
- ◆ Employees to be informed about parameters and requirements for references upon employment.
- ◆ The Proponent must employ Namibians where possible. Deviations from this practise should be justified appropriately.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ Record should be kept of training provided.
- ◆ Ensure that all training is certified or managerial reference provided (proof provided to the employees) inclusive of training attendance, completion and implementation.

6.1.4 Change in Land Use and Earning Potential

Change in land utilisation and related economic productivity was initiated with the construction phase. Construction and operational activities do not allow for previous land-use activities (mostly related to agriculture) to continue. The different land use being conducted, has led to changes in the way revenue is generated and contributed to the local, regional and national economy. The earning potential of the project area has been increased. In addition, the flow of revenue was altered as there is a difference and increase in employment, purchasing of goods and use of services. The impact is foreseen to have a positive impact on the economic sphere of the environment.

The related economic productivity of the current land use, will reach its full potential during the operational phase while the decommissioning phase will not share in such impact. However no post-closure land use has been identified yet and therefore the impact and related management and enhancement measures should be revisited closer to the decommissioning phase.

Desired Outcome: Contribution to local and national treasury as well sustain a stable earning potential for employees and industry.

Actions

Enhancement:

- ◆ The Proponent must employ local Namibians where possible.
- ◆ Maintain value addition activities for the life of quarry operations where possible.
- ◆ Investigate profitable post-closure land use possibilities.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Ensure all taxes and governmental levies (where required) are paid.
- ◆ All social security and related documentation kept on file.
- ◆ Financial auditing

6.1.5 Revenue Generation and Employment

Quarrying (as opposed to farming) has led to changes in the way revenue is generated and paid to the local and national treasury. Revenue generated from the property has been increased, not only by quarrying operations, but also in the value addition activities conducted on site. This include primarily sand washing and rock crushing activities. Operations have provided stable employment for the area for almost 45 years. Such employment contributes significantly to the economic resilience of the employees as well as the town. Employment is sourced locally while skilled labour/contractors may be sourced from other regions. The quarry further contributes to the transport sector as well as the construction industry at large. The impact is foreseen to have a positive impact on the economic and social sphere of the environment.

Once the quarry is decommissioned, there will be a change and probable loss in revenue generation, flow and employment. Post closure land use and possible revenue generating activities should be considered by the Proponent closer to the decommissioning phase.

Desired Outcome: Contribution to local and national treasury and provision of employment to local Namibians.

Actions

Enhancement:

- ◆ The Proponent must employ local Namibians where possible.
- ◆ If the skills exist locally, employees must first be sourced from the town, then the region and then nationally.
- ◆ Deviations from this practice must be justified.
- ◆ Post-closure land-use options to be considered by the Proponent.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Bi-annual summary report based on employee records.
- ◆ Financial auditing

6.1.6 Demographic Profile and Community Health

Operations have been ongoing for such a long time that current operations will not create a change in the demographic profile of the local community. Community health may be exposed to factors such as communicable disease like HIV/AIDS and alcoholism/drug abuse, associated with uneducated financial expenditure. An increase in foreign people in the area (potential job seekers) may potentially increase the risk of criminal and socially/culturally deviant behaviour. However, Henning Crusher is not the only employer in the area and therefore potential impacts on the demographic profile, is largely cumulative. The quarry has experienced criminal activities on site and have adopted measures to discourage such activities.

Desired Outcome: To prevent the spread of communicable disease and prevent / discourage socially deviant or criminal behaviour.

Actions:

Prevention:

- ◆ Employ primarily local people from the area, deviations from this practice should be justified appropriately.
- ◆ Adhere to all municipal by-laws relating to environmental health.
- ◆ Prohibit substances abuse on the site.
- ◆ Adopt an open-door policy to reporting of socially deviant or destructive behaviour related to employment duties.
- ◆ Provide a safe protocol for the report or whistle-blowing of criminal activities.
- ◆ Implement a reward system for excellence in conduct and employment.

Mitigation:

- ◆ Educational programmes for employees on HIV/AIDs and general upliftment of employees' social status.
- ◆ Appointment of reputable contractors.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Facility inspection sheets, for kitchen, toilets and showers, or any area which may present environmental health risks, kept on file.
- ◆ Bi-annual summary report based on educational programmes and training conducted.
- ◆ Bi-annual report and review of employee demographics.
- ◆ Records kept of all socially deviant, destructive or criminal reports received.

6.1.7 Traffic

No increase in traffic to the and from the site is foreseen for the immediate future of operations. The majority of material moved from site is transported by railway. The use of the railway has been a more recent introduction and have resulted in less heavy motor vehicles travelling to and from the site. This initiative is considered to have decreased congestion and decreased the risk of incidents and accidents, especially along the national and district routes. Access points onto the site and the D3007 District road have been suitably strengthened to accommodate the current traffic load. Operations have therefore to a great extent reversed initial impacts on the traffic. The use of the railway system is considered to have been a positive impact on the traffic. There still however remain risks associated with the transport of commodities to and from the site. These risks include collision and incident risks (such as break-downs).

Desired Outcome: Minimum impact on traffic and no transport or traffic related incidents.

Actions

Prevention:

- ◆ Erect clear signage for access points to the quarry.
- ◆ Maintain access points according to the requirements of the Roads Authority.
- ◆ All contractors or employees driving heavy motor vehicles should have appropriate training and qualifications to operate such vehicles.
- ◆ All vehicles to be roadworthy and appropriately licensed.
- ◆ All loads of material to be covered.

Mitigation:

- ◆ If any traffic impacts are expected, traffic management should be performed to prevent these.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Any complaints received regarding traffic issues should be recorded together with action taken to prevent impacts from repeating itself.
- ◆ A report should be compiled every 6 months of all incidents reported, complaints received, and action taken.

6.1.8 Health, Safety and Security

Every activity associated with operations is reliant on human labour and therefore exposes them to health and safety risks. Activities such as the operation of machinery and handling of the material, poses risks to employees. Employees will be exposed to elevated levels of dust and noise. In addition activities conducted on site (such as blasting) and excavation at the quarry face, creates unstable areas which pose safety risks to employees. Security risks are related to unauthorized entry, theft and sabotage.

Dust from the site is not considered to pose a health or safety risk to surrounding communities. Blasting may however cause some minor debris to fall-out on neighbouring properties. Blasting activities may further result in seismic influences (activity) that may impact surrounding structures and receptors. No complaints with regards to structure failure or damage have been recorded or reported to the Proponent. Blasting surveys have been completed.

Desired Outcome: To prevent injury, health impacts and theft.

Actions

Prevention:

- ◆ Notify neighbours about proposed blasting times and operations in advance.
- ◆ Clearly label dangerous and restricted areas as well as dangerous equipment and products.
- ◆ Implement a hazardous dust inspection, testing, housekeeping, and control program.
- ◆ Use proper dust collection systems and filters.
- ◆ Equipment must be locked away on site and placed in a way that does not encourage criminal activities (e.g. theft).
- ◆ Provide all employees with required and adequate personal protective equipment (PPE).
- ◆ Ensure that all personnel receive adequate training on operation of equipment / handling of hazardous substances and PPE, especially the importance of dust masks.
- ◆ All health and safety standards specified in the Labour Act should be complied with.
- ◆ Implementation of a maintenance register for all equipment and hazardous substance storage areas.
- ◆ Adopt a safety procedure / protocol for operations at the quarry faces. This should include:
 - Design orientation of the quarry faces to optimise stability for blasting and excavation, including failure modes and how they will be managed;
 - Bench elevation, chosen to minimise the production of large rocks at the highest face elevations;
 - Excavation method, selection of suitable equipment, and how this minimises risk to the quarry personnel;
 - An indication of the probability of failure or the factor of safety of the overall excavation;
 - The inspection and remediation scheme including the competencies of those involved in identifying and implementing problems and remedial measures;
 - What must be done before the quarry ceases operations or is abandoned to ensure that it is left, so far as is reasonably practicable, in a safe condition.

Mitigation:

- ◆ Selected personnel should be trained in first aid and a first aid kit must be available on site. The contact details of all emergency services must be readily available.
- ◆ Implement and maintain an integrated health and safety management system, to act as a monitoring and mitigating tool, which includes: colour coding of pipes, operational, safe work and medical procedures, permits to work, emergency response plans, housekeeping rules, MSDS's and signage requirements (PPE, flammable etc.).
- ◆ Strict security that prevents unauthorised entry.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ Any incidents must be recorded with action taken to prevent future occurrences.
- ◆ All to be educated in safety hazards around the site.
- ◆ Reports of safety inspections of the operating areas as well as machinery to be kept on file.

6.1.9 Fire

Construction and operational activities may increase the risk of the occurrence of fires. Operation of mechanical, fuel and electrical machinery increases the risk of fire on site. Additional quarry activities such as blasting may further increase the risk of fires. However, no explosives are stored within the project area. Similarly no fuel or large volumes of hydrocarbon material is kept on site. Operational areas are devoid of most combustible material while operating machines are removed from each other, thereby reducing the spread of potential fire which may occur. Similarly operational activities are located away from electrical powerlines which provide electricity to the site, as well as higher voltage power lines, south of the project area. Furthermore, dolomitic rock is less conductive than other geological structures and therefore has a reduced risk of lighting which may ignite natural fires.

Desired Outcome: To prevent property damage, possible injury and impacts caused by explosions or uncontrolled fires.

Actions:

Prevention:

- ◆ Ensure all chemicals, lubricants and flammable agents are stored according to MSDS instructions.
- ◆ Should explosives storage be considered, all safety requirements should be implemented.
- ◆ Maintain regular site, mechanical and electrical inspections and maintenance.
- ◆ Fire-fighting training to be provided to staff.
- ◆ Use appropriate electrical equipment and wiring methods.
- ◆ Control smoking (designated smoking areas), open flames, and sparks.
- ◆ Control mechanical sparks and friction and ensure mechanical parts are maintained and efficiently lubricated.
- ◆ Use separator devices to remove foreign materials capable of igniting combustibles from process materials.

Mitigation:

- ◆ A holistic fire protection and prevention plan is needed. This plan must include an emergency response plan and firefighting plan.
- ◆ Maintain firefighting equipment, good housekeeping and personnel training (firefighting, fire prevention and responsible housekeeping practices).

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ A register of all incidents must be maintained. This should include measures taken to ensure that such incidents do not repeat themselves.
- ◆ A report should be compiled every 6 months of all incidents reported. The report should contain dates when fire drills were conducted and when fire equipment was tested and training given.

6.1.10 Air Quality

During construction and operations, dust is generated through a variety of activities. Movement of material, travelling of vehicles and machines, crushing activities, earthmoving and blasting are some of the main dust generating activities. Dust may impair visibility along roads, pose health risks due to inhalation of suspended particulate matter, or inhibit plant health through settling on vegetation. Greenhouse gas emissions are only related to vehicles on site and are negligible in terms of the airshed quality. No other substance which may impact the air quality is released on site. The dolomite formations are not linked to any naturally occurring hazardous substance such as asbestos or galena. Therefore the extraction of the material will not result in related health risks.

Desired Outcome: To prevent health impacts and minimise dust generation.

Actions

Mitigation:

- ◆ Personnel issued with appropriate masks where excessive dust is present.
- ◆ A complaints register should be kept for any dust related issues and mitigation steps taken to address complaints where necessary e.g. dust suppression.
- ◆ Dust extraction units must be properly placed and maintained.
- ◆ Employ dust monitoring systems and implement dust abatement measures.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ Any complaints received regarding dust should be recorded with notes on action taken.
- ◆ On site dust monitoring to be conducted.
- ◆ All information and reporting to be included in a bi-annual report.

6.1.11 Noise and Vibration

Unusual and increased noise levels related to quarrying activities may present a nuisance to affected and adjacent receptors. Such noise may be contrary to the existing character of the regions and disturb wildlife. The main noise generating activities are related to earthworks, blasting, material handling and crushing activities. All operating machines further emit continual noise, contributing to the overall ambient noise of the site. The natural topography however shields the majority of noise generated on site from the neighbours, mostly located east of the site. Operations have the potential to alter the background noise of neighbouring receptors. Blasting and vibration events are monitored. Blasting may cause vibrations to adjacent receptors. Severe vibration may result in structural damage.

Desired Outcome: To prevent any nuisance and hearing loss due to noise generated.

Actions

Prevention:

- ◆ Follow Health and Safety Regulations of the Labour Act and World Health Organization (WHO) guidelines on maximum noise levels (Guidelines for Community Noise, 1999) to prevent hearing impairment.
- ◆ All machinery must be regularly serviced to ensure minimal noise production.
- ◆ The use of non-electric delay detonator is recommended.
- ◆ Noise dampers to be fitted on rock breaking and crushing machines where suitable.
- ◆ Noise level measurements should be performed to determine the most pertinent noise generators. Appropriate PPE should be provided to all employees in close proximity to such noise generators.
- ◆ Noise and vibration will be monitored by the use of a seismograph; (from experience it is estimated that ground vibration at 200 m from the blast locus is negligible and well within safe limits. Noise perception at 500 m from the locus of the blast is very low compared to normal traffic movement of heavy motor vehicles).

Mitigation:

- ◆ Hearing protectors as standard PPE for workers in situations with elevated noise levels.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ Health and Safety Regulations of the Labour Act and WHO Guidelines.
- ◆ Maintain a complaints register.
- ◆ Bi-annual report on complaints and actions taken to address complaints and prevent future occurrences.

6.1.12 Waste Production

Various waste streams are produced during the construction and operational phase. Waste presents a contamination risk and when not removed regularly may become a fire and/or health hazard. Waste water, rubble and any other waste products not being contained may be washed from the site during rainfall events. All domestic waste is removed from the project area by the Proponent. Similarly all hazardous waste such as oily rags and waste oil are also removed from the site by the Proponent on a weekly bases. Sewage and grey water from the ablution facility is disposed of through a French drain.

Waste produced though the quarrying operations mainly refer to the waste water produced by the sand washing plant. All waste water is disposed at the sludge dam.

Desired Outcome: To reduce the amount of waste produced, and prevent contamination, pollution and littering.

Actions

Prevention:

- ◆ Waste reduction measures should be implemented and all waste that can be re-used / recycled must be kept separate.
- ◆ Ensure adequate disposal and storage facilities are available.
- ◆ Waste collection points to be clearly demarcated and maintained.
- ◆ Hazardous waste storage collection points (such as for old oil, rags, etc.) should be on an impermeable layer.
- ◆ Ensure waste cannot be blown away by wind.
- ◆ Prevent scavenging (human and non-human) of waste.

Mitigation:

- ◆ Solid waste should be disposed of regularly and at appropriately classified disposal facilities, this includes hazardous material (empty chemical containers, contaminated rugs, paper water and soil).
- ◆ See the material safety data sheets available from suppliers for disposal of contaminated products and empty containers.
- ◆ Liaise with the municipality regarding waste and handling of hazardous waste where required.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ A register of hazardous waste disposal should be kept. This should include type of waste, volume as well as disposal method/facility.
- ◆ Any complaints received regarding waste should be recorded with notes on action taken.
- ◆ All information and reporting to be included in a bi-annual report.

6.1.13 Ecosystem and Biodiversity Impact

The majority of habitats associated with the site have been impacted and altered. The nature of the operational activities is such that the probability of creating a habitat for flora and fauna to establish is low, apart for primary species establishment. No species of importance have been identified on site during the recognisance site visit. Impacts which have resulted due to operations include the following:

- ◆ Flora destruction due to the physical removal of vegetation cover.
- ◆ Habitat destruction and disturbance of fauna and flora. Disturbances may range from dust, noise, movement, vibration, lighting and poaching. Destruction refers to the physical removal / damage of habitats.
- ◆ Due to the disturbance of habitats, the ecosystems integrity is compromised on the site.

Desired Outcome: To avoid pollution of, and additional impacts on, the ecological environment.

Actions.

Mitigation:

- ◆ Mitigation measures related to waste handling and the prevention of groundwater, surface water and soil contamination should be adopted.
- ◆ Avoid scavenging of waste by fauna.
- ◆ The establishment of habitats (by primary and invader species) at the quarry should be prevented. Regular clearing of invader species should be conducted to prevent spread of such species across the site and onto neighbouring properties.
- ◆ Any sighting of protected species should be documented.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Invader species eradication to be reported on.
- ◆ All information and reporting to be included in a bi-annual report.

6.1.14 Soil Degradation

Soil degradation and disturbance occur when topsoil layers are stripped during sand mining. Subsoil layers are excavated across large portions of the site to enable access to the dolomite resources. On portions where soil is retained to support infrastructure and operations, compaction of the soil has resulted. Vegetation removal from soil at operational areas increases the risk of erosion. Increased run-off on compacted surfaces may result in changed groundwater recharge and erosion.

Areas where soil has been retained may be exposed to contamination risks mainly due to hydrocarbons.

Removed soil is washed and sold as a commodity while a portion of the topsoil layers are stockpiled for rehabilitation. However, quarrying activities are foreseen to continue in excess of 10 years.

Desired Outcome: To prevent the degradation and contamination of soil.

Actions

Prevention:

- ◆ Stack topsoil separately.
- ◆ Regular inspections and maintenance of all vehicles to ensure no leaks are present.
- ◆ Vehicles to be serviced and fuelled at appropriate facilities (such as workshop) on an impermeable surface with related pollution management structures.
- ◆ All waste must be removed from the project operational area and disposed of timeously.
- ◆ Any spills must be cleaned up immediately.
- ◆ Hydrocarbon fuel spills to be remediated and significant spills to be logged on an incident register.
- ◆ Polluted soil and building rubble must be transported away from the site to an approved and appropriately classified waste disposal site.
- ◆ Polluted soil must be remediated where possible.
- ◆ Flow attenuation structures to be employed at drainage water discharge points where flow is concentrated.
- ◆ All vehicles must be serviced and maintained regularly.
- ◆ Vehicles may only be serviced and refuelled on a suitable spill control structure.
- ◆ Spill control by making use of drip trays if there is a need to repair machinery on site. All hydrocarbon based waste must be removed from site and disposed of at a recognised hazardous waste disposal facility.
- ◆ Any polluted soil or water to be treated as a hazardous waste.
- ◆ Proper training of employees must be conducted on a regular basis.

Mitigation:

- ◆ Implementation of incidents register.
- ◆ Implementation of maintenance register for all equipment and fuel / hazardous substance (such as chemicals) storage areas. All chemicals to be handled and stored according to MSDS labels.
- ◆ Spill clean-up means must be readily available on site as per the relevant MSDS.
- ◆ Once quarrying is completed, reshaping of excavated areas should be conducted and appropriate rehabilitation initiated for post-quarrying land use of the site. Material from the sludge dam should be repurposed where appropriate.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ Record keeping of sewage waste tank overflow and chemical spills.
- ◆ Record of all spill clean-ups.
- ◆ Record of topsoil storage.

6.1.15 Groundwater and Surface Water Use and Contamination

Water pollution could become a problem if any contamination of surface water bodies or ground water is experienced. Within the site boundaries, rainwater will naturally follow the slope of the quarry to accumulate at the lowest point. Currently operations are above ground but will eventually proceed to below the natural topography. Water from rainfall events are expected to collect in the quarry pits. The storm-water run-off from the higher elevation catchment area will occur in the form of sheet flow, which may be laden with silt and mud particles. It is not expected that the water table will be intercepted during quarrying activities. No seepage to the pit areas are foreseen. Should groundwater however be encountered, the risk of water contamination is increased and dewatering will be necessary.

Provision of process and potable water include abstraction of groundwater through three production boreholes. The amounts required for daily operations of the quarry and related activities are not foreseen to affect the groundwater resources' sustainability. Abstraction amounts are well within the capability of the delivery capacity of the boreholes. It is not foreseen that the groundwater utilization will impact the availability groundwater to surrounding users.

Desired Outcome: To prevent the contamination of water and soil.

Actions

Prevention:

- ◆ No servicing or maintenance of machines to be conducted within pit areas.
- ◆ Where possible, all machines, equipment and waste to be removed from pit areas prior to rainfall events.
- ◆ Hydrocarbon fuel spills to be remediated and significant spills to be logged on an incident register.
- ◆ Polluted soil and building rubble must be transported away from the site to an approved and appropriately classified waste disposal site.
- ◆ Flow attenuation structures to be employed at concentrated flow areas to prevent erosion.
- ◆ The procedures followed to prevent environmental damage during service and maintenance, and compliance with these procedures, must be audited and corrections made where necessary.
- ◆ Proper training of employees must be conducted on a regular basis.
- ◆ Maintain sewerage systems and conduct regular monitoring.

Mitigation:

- ◆ All spills or any contamination within the quarry pit area to be cleaned immediately to prevent contamination of groundwater resources.
- ◆ Consult relevant MSDS information and a suitably qualified specialist where needed.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ Maintain MSDS for hazardous chemicals.
- ◆ Sample and analyse groundwater annually to test for contamination.
- ◆ Report all spills or leaks to management and initiate clean-up immediately.
- ◆ Maintain a register of all incidents on a daily basis. This should include measures taken to ensure that such incidents do not repeat themselves.

6.1.16 Visual Impact

The nature of the project is contrary to the existing landscape character. Surrounding land use comprise mainly agricultural activities. Quarrying activities have changed the land-use and topography, thereby altering the landscape. It is inevitable that operations will create a visual impact due to the change of topography and the eventual permanent re-profiling of the landform. Such changes may affect visual receptors, existing land users and operations which are reliant on the existing landscape character (such as tourism). However, none of the visual receptors (neighbours) were identified to be reliant on this specific landscape character. In addition, the quarry site is located about 2 km from the district road. The property between the road and the quarry is densely vegetated and quarry is not visible from the road. The visual impact rating of the quarry is therefore considered to be less significant.

Desired Outcome: To minimise aesthetic impacts associated with the quarry.

Actions

Mitigation:

- ◆ Indigenous trees can be planted along the eastern boundaries of the project site.
- ◆ Regular waste disposal, good housekeeping and routine maintenance on infrastructure will ensure that the longevity of structures are maximised and a low visual impact is maintained.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ A report should be compiled every 6 months of all complaints received related to aesthetic appearance of the site.

6.1.17 Cumulative Impact

Cumulative impacts are those potential impacts which in itself may not be considered significant, however when considered as a collective may be significant. Some of the identified impacts may be at a regional scale.

- ◆ Sustainable and long term employment (positive),
- ◆ Contribution to local and regional economy (positive),
- ◆ Potential long term degradation of soil (negative),
- ◆ Ecosystem function and habitat loss (negative), and
- ◆ Waste production (negative).

Desired Outcome: To minimise all cumulative impacts associated with the farm.

Actions

Mitigation:

- ◆ Addressing each of the individual impacts as discussed and recommended in the EMP would reduce the cumulative impact.
- ◆ Reviewing biannual reports for any new or re-occurring impacts or problems would aid in identifying cumulative impacts. Planning and improvement of the existing mitigation measures can then be implemented.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Create a summary report based on all other impacts to give an overall assessment of the impacts of the operational phase.

6.2 DECOMMISSIONING AND REHABILITATION

Decommissioning is not foreseen during the validity of the ECC. Decommissioning was however assessed. Should decommissioning occur at any stage, rehabilitation of the area may be required. Decommissioning will entail the complete removal of all infrastructure including buildings and underground infrastructure. Any pollution present on the site must be remediated. The impacts associated with this phase include noise and waste production as structures are dismantled. Noise must be kept within Health and Safety Regulations of the Labour Act and WHO standards and waste should be contained and disposed of at an appropriately classified and approved waste facility and not dumped in the surrounding areas. Future land use after decommissioning should be assessed prior to decommissioning and rehabilitation initiated if the land will not be used for similar future purposes. The EMP for the facility will have to be reviewed at the time of decommissioning to cater for changes made to the site and to implement guidelines and mitigation measures.

6.3 ENVIRONMENTAL MANAGEMENT SYSTEM

The Proponent could implement an Environmental Management System (EMS) for their operations. An EMS is an internationally recognized and certified management system that will ensure ongoing incorporation of environmental constraints. At the heart of an EMS is the concept of continual improvement of environmental performance with resulting increases in operational efficiency, financial savings and reduction in environmental, health and safety risks. An effective EMS would need to include the following elements:

- ◆ A stated environmental policy which sets the desired level of environmental performance;
- ◆ An environmental legal register;
- ◆ An institutional structure which sets out the responsibility, authority, lines of communication and resources needed to implement the EMS;
- ◆ Identification of environmental, safety and health training needs;
- ◆ An environmental program(s) stipulating environmental objectives and targets to be met, and work instructions and controls to be applied in order to achieve compliance with the environmental policy;
- ◆ Periodic (internal and external) audits and reviews of environmental performance and the effectiveness of the EMS, and
- ◆ The EMP.

7 CONCLUSION

The quarrying operations of Henning Crusher play a positive economic role in the Oshikoto Region due to the provision of commodities as well as the contribution to sustaining livelihoods of secondary industries and related employees. The use of the land for sand and construction stone has a beneficial role in generating income in the region and providing raw materials crucial to the construction industry. The site on which quarrying is conducted is less suitable for agricultural activities due to its rocky and mountainous nature.

Operational related impacts must be mitigated by implementing strict monitoring and control methods. All permits and approvals must be obtained from relevant ministries or authorities for the operation of the quarry. Pollution prevention measures should be adequate to prevent incidents that may potentially pollute groundwater and surface water. Health, safety and security regulations should be adhered to in accordance with the regulations pertaining to relevant laws and standards. The quarries are on private land and no need for additional fencing is required. Continued rehabilitation efforts of old mined-out areas should be supported.

The EMP should be used as an on-site reference document for the operations of the facility. Parties responsible for transgressing of the EMP should be held responsible for any rehabilitation that may need to be undertaken. The Proponent could use an in-house Health, Safety, Security and Environment Management System in conjunction with the EMP. All operational personnel must be taught the contents of these documents.

Should the Directorate of Environmental Affairs (DEA) of the MEFT find that the impacts and related mitigation measures, which have been proposed in this report, are acceptable, the ECC may be renewed. The ECC issued based on this EMP, will render the EMP a legally binding document to which the Proponent should adhere to at all times.

8 REFERENCES

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Appendix A: Consultant Curriculum Vitae

ENVIRONMENTAL ASSESSMENT PRACTITIONER**Quzette Bosman**

Quzette Bosman has 16 years' experience in the Impact Assessment Industry, working as an Environmental Assessment Practitioner and Social Assessment practitioner mainly as per the National Environmental Legislation sets for South Africa and Namibia. Larger projects have been completed in terms of World Bank and IFC requirements. She studied Environmental Management at the Rand Afrikaans University (RAU) and University of Johannesburg (UJ), including various Energy Technology Courses. This has fuelled a passion towards the Energy and Mining Industry with various projects being undertaken for these industries. Courses in Sociology has further enabled her to specialize in Social Impact Assessments and Public Participation. Social Assessments are conducted according to international best practise and guidelines. Work has been conducted in South Africa, Swaziland and Namibia.

CURRICULUM VITAE QUZETTE BOSMAN

Name of Firm	:	Geo Pollution Technologies (Pty) Ltd.
Name of Staff	:	QUZETTE BOSMAN
Profession	:	Social Impact Assessor / Environmental Assessment Practitioner
Years' Experience	:	16
Nationality	:	South African
Position	:	Senior Environmental Consultant
Specialisation	:	ESIA & ESMP; SIA
Languages	:	Afrikaans – speaking, reading, writing – excellent English – speaking, reading, writing – excellent German –speaking, reading - fair

First Aid Class A	EMTSS, 2017
First Aid LSM	OSH-Med International 2022
Basic Fire Fighting	EMTSS, 2017
Basic Industrial Fire Fighting	OSH-Med International 2022

EDUCATION AND PROFESSIONAL STATUS:

BA	Geography & Sociology	:	Rand Afrikaans University, 2003
BA	(Hons.) Environmental Management	:	University of Johannesburg, 2004

PROFESSIONAL SOCIETY AFFILIATION:

Namibian Environment and Wildlife Society
International Association of Impact Assessors South Africa (IAIA SA)
Member 2007 - 2012
Mpumalanga Branch Treasurer 2008/2009

OTHER AFFILIATIONS

Mkhondo Catchment Management Forum (DWAF): Chairperson 2008-2010
Mkhondo Water Management Task Team (DWAF): Member 2009

AREAS OF EXPERTISE:

Knowledge and expertise in:

- ◆ environmental impact assessments
- ◆ project management
- ◆ social impact assessment and social management planning
- ◆ community liaison and social monitoring
- ◆ public participation / consultation, social risk management
- ◆ water use licensing
- ◆ environmental auditing and compliance
- ◆ environmental monitoring
- ◆ strategic environmental planning

EMPLOYMENT:

2015 - Present	:	Geo Pollution Technologies – Senior Environmental Practitioner
2014-2015	:	Enviro Dynamics – Senior Environmental Manager
2010 - 2012	:	GCS – Environmental Manager (Mpumalanga Office Manager)
2007 - 2009	:	KSE-uKhozi - Technical Manager: Environmental
2006 -2007	:	SEF – Environmental Manager
2004 - 2005	:	Ecosat – Environmental Manager

PUBLICATIONS:

Contract reports	:	+190
Publications	:	1