APP - 001719

SAND MINING OPERATIONS IN THE FISH RIVER, //KARAS REGION

UPDATED ENVIRONMENTAL PLAN

Assessed by:

Assessed for:

July 2023

Project:	**SAND MINING OPERATIONS IN THE FISH RIVER //KARAS REGION: UPDATED ENVIRONMENTAL MANAGEMENT PLAN**	
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Report Approval	20230719 Super Sand Keetmanshoop Updated Report	

I _____ acting on behalf of Kachas Industrial T/A Super Sand 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 Mariental on the 19th day of July 2023

_____
Kachas Industrial T/A Super Sand

T63/2000
Company Registration

SUMMARY

The Kachas Industrial Trust has been operating a sand mine in the Fish River of the Keetmanshoop District since 2008. The operations, as conducted under the trading name of Super Sand, provide raw material (sand) to a brickfield in Keetmanshoop some 45 km east of the mine site.

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-00741) for the sand mining activities of Super Sand.

The sand mine is situated in an area where surrounding land use is primarily agriculture. Due to the nature and location of the sand mine, mining 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 sand mine 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 AND INTRODUCTION

Kachas Industrial Trust T/A Super Sand (hereafter referred to as Super Sand) plans to expand their sand mining activities along the Fish River in the Keetmanshoop District of the //Karas Region. Sand mining operations in the area, which have mainly concentrated just north of the B4 National road, have been conducted by Super Sand since 2008. Figure 1-1 depicts the area over which the proposed sand mining operations are planned to operate in the future.

The main operational activities include:

- Land clearing,
- removal of sand deposits and,
- loading sand for transportation.

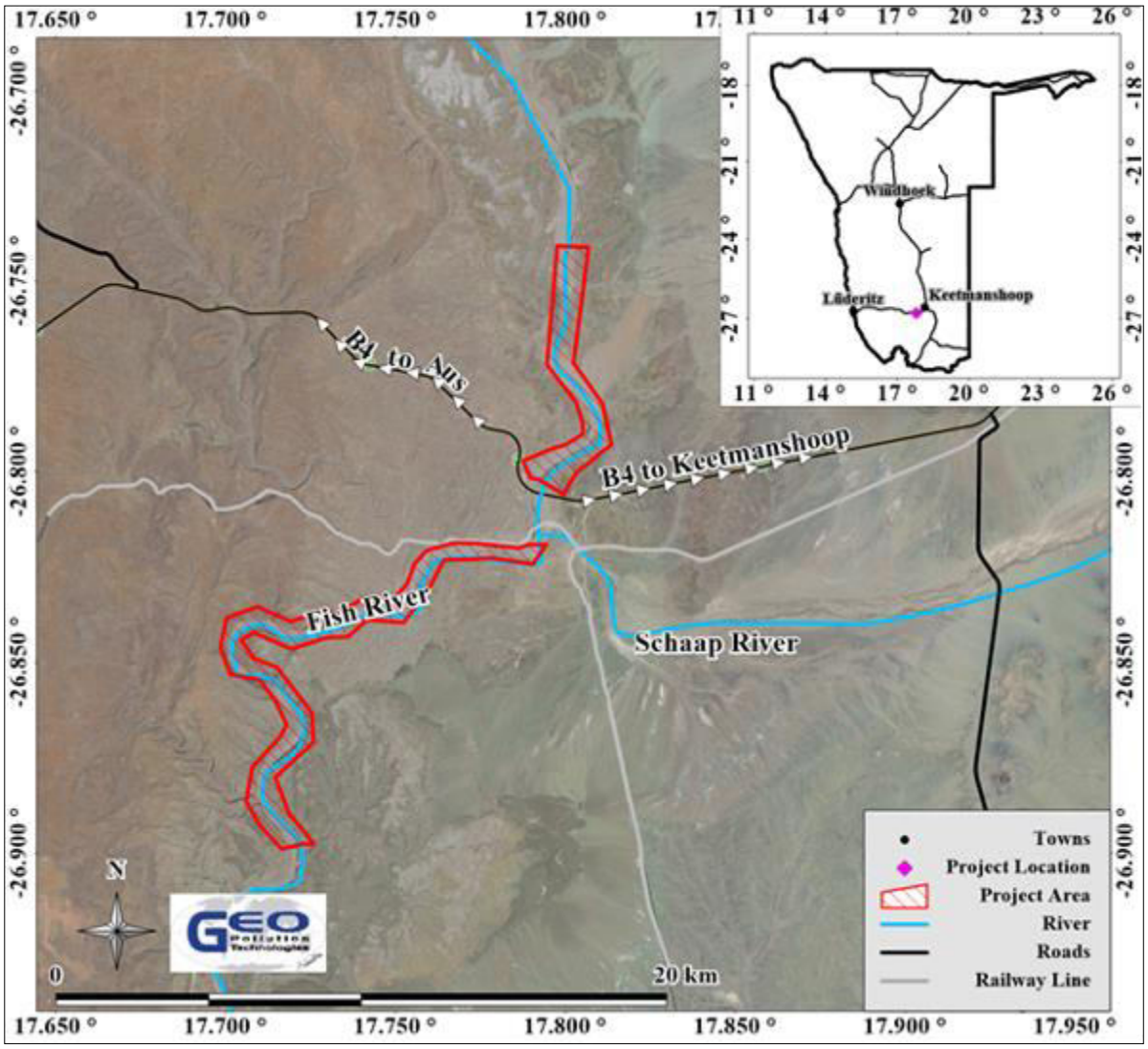

Figure 1-1. Location map

A brief risk assessment was undertaken in 2016 (Bosman et al. 2016) 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 – Keetmanshoop is located along the B4 National Road and main route between Windhoek and the Northern Cape Province of South Africa and it is a remote settlement far removed from any industrial hub such as Windhoek and Walvis Bay. Provision of the essential raw materials required in the brick making proses, the sand, is costly to transport over extended distances. Therefore, to reasonably sustain the brick making and construction activities in the area, Super Sand have been mining sand from the Fish River and transporting it to the nearby brickfield in Keetmanshoop. The sediments in the lower Fish River contains significantly less clay minerals, compared to the other smaller riverbeds in the area. This makes the Fish River sediments the best construction material near Keetmanshoop

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 Keetmanshoop 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 3-1 and Table 3-2 govern the environmental assessment process in Namibia and/or are relevant to the development.

Table 3-1 Namibian law applicable to the project

Law	Key Aspects
The Namibian Constitution	♦ 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	♦ 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	♦ 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	♦ 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
The Water Act Act No. 54 of 1956	♦ 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	♦ 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)	♦ 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
Forest Regulations: Forest Act, 2001 Government Notice No. 170 of 2015	♦ 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	♦ Define the powers, duties and functions of local authority councils ♦ Regulates discharges into sewers

Law	Key Aspects
Public and Environmental Health Act Act No. 1 of 2015, Government Notice No. 86 of 2015	♦ 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	♦ 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	♦ 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	♦ 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)	♦ Not in force yet ♦ Provides for prevention and control of pollution and waste ♦ Provides for procedures to be followed for licence applications

Table 3-2 Relevant multilateral environmental agreements for Namibia and the development

Agreement	Key Aspects
Stockholm Declaration on the Human Environment, Stockholm 1972.	♦ 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)	♦ 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	♦ 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	♦ 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

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 – Sand is considered a natural resource.
- 3.3. Resource extraction, manipulation, conservation and related activities. – Sand is being extracted/mined

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 Super Sand 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

Current and future operations are located in the Keetmanshoop Rural Constituency of the //Karas Region. The B4 Main Road, which is the main transport route between Lüderitz and Keetmanshoop, passes through the site, dividing it with a bridge into a Northern- and Southern Portion, within the Fish River. One kilometre south of the B4 crossing, is the main railway line between Lüderitz and Keetmanshoop, while a low water bridge is located 200 m north of the Main Road B4.

There are no registered conservancies in close proximity to the site and no traditional authorities are registered or active along the area. Operations are active on the farms Seeheim West (also known as Klein De Rust) and on the farms Naiams, Schlagkopf, Vishoek, Seeheim West (also known as Groot De Rust), Flugsand and Dagbreek. All of the properties as mentioned above have been zoned for agricultural use.

5.2 CLIMATE

The sand mine is situated in a semi-arid highland savannah region. Heavy rainfall in this region is mostly common between January and March, peaking mostly in March, whilst May to September have little or no rainfall. The aridity of the region causes water resources to be a scarce commodity that has to be conserved and protected from pollution. Groundwater is an important source of water in the region and downstream users.

Table 3-3 Summary climate data

Average annual rainfall (mm/a)	100-150
Variation in annual rainfall (%)	60-70
Average annual evaporation (mm/a)	3,400-3,600
Water deficit (mm/a)	2,301-2,500
Average annual temperatures (°C)	19-20

5.3 TOPOGRAPHY AND SURFACE WATER

The site is located within the Fish River catchment, an ephemeral river draining in a southerly direction as part of the Orange River Basin. It is the largest contributor to the Orange River downstream of the Orange/Vaal confluence and flash floods with flows exceeding 2,000 m^3/s may occur. Numerous unnamed tributaries flow into the river along the site with the main tributary river being the Schaap River.

5.4 GEOLOGY AND HYDROGEOLOGY

The underlaying geology consists predominantly of red shale and red to purple sandstone, locally greenish of the Nababis Formation (ENb) as well as from the younger Gross Aub Formation (EGaRs) of the Fish River Subgroup. This is partly covered by Quaternary alluvial (Qa) along the river beds. The alluvial thickness in the Fish River is not very consistent with the underlying rock formations often exposed in the riverbed. Some Dwyka (CDw) formations of the Karoo Sequence is present at some places.

The Fish River sediments contains much less fine material than the Schaap River, even though both rivers drains areas underlain by similar geological formations. The longer length of the Fish River allows for better separation of the fine and coarse material and therefore this section of the river is characterise by more sandy deposits. The smaller catchment of the Schaap River does not allow for this separation of fines, making the alluvial not suitable as a building material.

5.5 FAUNA AND FLORA

The project area is located in southern Namibia in the Nama Karoo biome. The vegetation structure of the area is described as sparse shrubland with a Dwarf Shrub Savannah vegetation type. The project location may in some areas fall within the transition zone between the Dwarf Shrub Savannah and Karas Dwarf Shrubland Savannah since it runs parallel to the latter vegetation type at a distance of between 500 m and 5,000 m. However, since the project location is in and on the banks of the Fish River, vegetation characteristics would mostly be determined by the alluvial habitat and is typically low open to sparse woodlands with higher species diversity and abundance.

5.6 DEMOGRAPHIC CHARACTERISTICS

The site is within and adjacent to the Seeheim community which had been established along the Seeheim Siding. A handful of houses and residents (mostly related to the Seeheim Hotel) are present east of the site. The localised population (within a radius of 1 km around the site) is less than 40 persons. There are no informal settlements on or close to the site. The Seeheim community is an integrated community with well established relationships. Surrounding land owners comprise a mixture of Namibians and South Africans.

6 ENVIRONMENTAL MANGEMENT PLAN

The following general guidance for the EMP is based on the findings of the Environmental Impact Assessment: Scoping Report & Risk Assessment carried out by Geo Pollution Technologies. The impacts identified have been updated as per this updated EMP listed below.

Table 3-4 Possible impacts associated with the mining project

ACTIVITY	DESCRIPTION	SENSITIVITY	POTENTIAL IMPACT
Excavating sand from riverbed with frontend loader and loading on tipper truck.	Change in river morphology. This includes the width of the active channel as well as the gradient of the riverbed.	Erosion	Changes in channel morphology can increase erosion of the river with an increase in sediment load during floods.
		Groundwater	Lower flow velocities due to wider channel and reduced river bed gradient will increase the infiltration time. Removal of clay layers in the soil profile may further enhance groundwater recharge.
	Removal of vegetation (protected and invasive species).	Fauna and flora	♦ Ecological effects on bird nesting. ♦ Ecosystem functioning. ♦ Loss of habitat. ♦ Protected plant species.
		Erosion	Removal of vegetation will increase the risk of erosion as the anchoring effect offered by plants are lost.
	Exposure of groundwater.	Groundwater	Increased evaporation of water may cause salinization of groundwater and soil.
	Creating ponds and pools of water which may be used by animals and surrounding communities.	Surrounding land users and community	Increased risk of health and safety to community (drowning).
	Discovery of heritage artefacts during excavation activities.	Heritage resources	Loss of heritage resource.
	Spillage of fuel, lubrication oil or hydraulic oils.	Surface and groundwater as well as soil	Surface and groundwater pollution. Soil pollution.
	Noise	Noise	Nuisance and health impact on neighbours and workers.
	Dust	Air quality	Nuisance and health impact on neighbours and workers.
Transporting sand with tipper truck to the stockpile.	Construction of additional roads.	Fauna and flora	♦ Ecological effects on bird nesting. ♦ Ecosystem functioning. ♦ Loss of habitat. ♦ Protected plant species. ♦ Influx in invasive plant species.
	Spillage of fuel, lubrication oil or hydraulic oils.	Surface and groundwater as well as soil.	Surface and groundwater pollution. Soil pollution.
	Noise	Noise	Nuisance and health impact on neighbours and workers.
	Dust	Air quality	Nuisance and health impact on neighbours and workers.

ACTIVITY	DESCRIPTION	SENSITIVITY	POTENTIAL IMPACT
Stockpiling and maintenance as well as loading of stockpiled sand onto tipper trucks with frontend loader.	Soil at the stockpile areas will be compacted / hardened by operations.	Soils and grazing land	♦ Reduction in grazing capability of the land. ♦ Change in landscape character.
	Spillage of fuel, lubrication oil or hydraulic oils. Impacts from sewage treatment.	Surface and groundwater as well as soil.	Surface and groundwater pollution. Soil pollution.
	Noise	Noise	Nuisance and health impact on neighbours and workers.
	Dust	Air quality	Nuisance and health impact on neighbours and workers.
Transport of material to markets.	Transportation to markets may increase road degradation and increase collision risk.	Traffic	Increased collision risk. Road degradation as more frequent heavy loads stress the road surface and base especially at the access point to the road. Particulate fly-off from uncovered loads may increase collision and incident risks.
Sand supply	Sand are used in the construction industry: Providing affordable material to the local community.	Keetmanshoop and surrounding community	♦ Positive contribution to the town economy and development. ♦ Increased economic resilience. ♦ Aspiration towards the future.
Employment	Providing job opportunities	Socio-economic	♦ Positive contribution. ♦ Increase economic resilience.
	Waste from employees	Waste	Domestic waste and sewage effluent must be properly managed.
	Poaching and gathering of firewood.	Fauna and flora	No poaching and wood gathering is allowed. Employees only allowed at work areas.

7 THE IMPLEMENTATION OF THE ENVIRONMENTAL MANAGEMENT PLAN

Table 7-1 and Table 7-2outline the management of the environmental elements during the planning and operational phases. Section 8 provides a brief summary of the management of the mine closure phase. Contents of these tables could be incorporated into a health safety environment and quality management system. The Proponent would be responsible to assign the responsibilities and to ensure that the tasks are executed.

Table 7-1 Planning for operations and future decommissioning of the project

Activity	Objective	Action	Timing	Proof of Compliance	Responsible Body
Compliance	To comply with all legal requirements for the operations of a sand mine in Namibia	A permit as prescribed by the Water Act of 1956 is required in all instances where the flow of a river is altered or interfered with. Apply for the necessary permits from the various ministries, local authorities and any other bodies that governs the construction and operations of the sand mining activity.	Concurrently with application for ECC.	All contracts, permits, certificates and other legal documents on file.	Proponent
Appointments	To appoint reputable contractors (if so required) and operational personnel and establish the EMP, a legal requirement that forms part of the contract with the contractor and employees.	Appoint a contractor and employees and enter into an agreement which includes the EMP. Ensure that the contents of the EMP are understood by the contractor, sub-contractors, employees and all personnel who will be present on site.	As required / need arises to employ a contractor. Permanent employees should be informed about the EMP prior to being on site.	Contracts on file.	Proponent; Contractor
Management	Establish a management system to implement and monitor health, safety and environmental performance.	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 in place to deal with all emergencies: Risk management / mitigation / EMP/ emergency response plan and health, safety and environmental manuals;	Upon receipt of the ECC and to be kept during the operational and decommissioning phases.	Documentation on file. Personal Protection Equipment (PPE) on site. Signage related to restricted areas, dangerous areas, and PPE requirements on site. Emergency response material on site. All plans on file.	Proponent; Contractor

Activity	Objective	Action	Timing	Proof of Compliance	Responsible Body
		Adequate protection and indemnity insurance cover for incidents; Comply with the provisions of all relevant safety standards; Procedures, equipment and materials required for emergencies.			
Restoration Fund/Insurance	To establish a fund/insurance for future environmental restoration or pollution remediation if ever required.	To establish a fund for future ecological restoration of the project site should project activities cease and the site is decommissioned and environmental restoration or pollution remediation is required. Any mined out areas must be rehabilitated immediately.	During operations.	Financial statements of restoration fund/insurance.	Proponent; Independent Specialist Consultant
Economy	Maintain a positive input into the local and regional economy and industrial sector.	All capital investment as required for machinery and maintenance to be invested into local or regional business sector. Should the opportunity arise, employment opportunity and subcontracting to the local community should be considered by the mining company.	Continuous.	Financial reporting.	Proponent
Monitoring & Reporting	To establish a reporting system to report on monitoring aspects of operations and decommissioning as outlined in the EMP and in line with the conditions of the ECC.	Establish a reporting system to report on aspects of operations and decommissioning as outlined in the EMP. Establish a monitoring system to provide data on profile changes as well as sediment transport capacity.	During operations as well as possible future decommissioning of the mine.	Monitoring reports.	Proponent; Contractor

Activity	Objective	Action	Timing	Proof of Compliance	Responsible Body
		Keep monitoring reports on file for submission as per the conditions of the ECC.			
Biophysical (Ecological)	To preserve large tree and protected plant species and combat invasive plant species.	All staff should be trained in identifying any sensitive plant species which may occur on site. Mining to be conducted with buffer zones around protected trees and structures where required. Alien / Invasive plant species should be eradicated.	Prior to future operational areas and refreshers annually.	Attendance record for training held.	Proponent
Environmental Clearance Renewal	To renew the ECC every three years.	Appoint a specialist environmental consultant to update the EMP and apply for renewal of the ECC.	Prior to expiry of ECC.	Renewed ECC.	Proponent; Independent Specialist Consultant

Table 7-2 The operational phase

Criteria	Objective	Mitigation	Monitoring	Responsible Body
Infrastructure	To protect all existing infrastructure components against possible erosion cut-back.	The excavation of sand may not take place within 200 metres upstream or downstream from any developed river bank areas, bridge or plots.	Continued mapping of mining area by taking GPS coordinates of mining area. Monthly inspections.	Proponent / Independent Audit
Economy	Maintain a positive input into the local and regional economy and industrial sector.	All capital investment as required for machinery and maintenance to be invested into local or regional Namibian business sector. Should the opportunity arise, employment opportunity and subcontracting to the local community should be considered by the mining company. Adherence to all Namibian law relating to revenue generation and employment generation.	Financial and human resource reporting.	Proponent
Traffic	To reduce the possibility of accidents or collision risk on site as well as on public roads. Prevent damage to other vehicles due to material falling from trucks. Damage to road surface at the access point.	Road traffic signs, warning oncoming traffic of heavy motor vehicle turning, to be erected (permission to be acquired from the Roads Authority). Such signs should be erected for any other entrance which may be used in the future along any public road (access point). All trucks should have their loads covered with a suitable covering to prevent fly-off rocks, sand and debris.	Installation and maintenance records of load covering kept. A report should be compiled every 6 months of all incidents reported, complaints received. Record of access point upgrade kept.	Proponent
Fire	Reduce the probability of an outbreak of a fire.	Open fires should not be allowed at the site. Fire precautions and fire control must be present at the site. In addition to this, all personnel have to be sensitised about responsible fire protection measures and good housekeeping such as the removal of flammable materials including rubbish, dry vegetation, and hydrocarbon-soaked soil from the vicinity of the construction. Regular inspections should be carried out to check for these materials at the site. A holistic fire protection and prevention plan is needed. This plan must include an emergency response plan and	A report should be compiled annually of all incidents reported. The report should contain dates when fire equipment was tested and when Heavy Motor Vehicle (HMV) and consumer fuel storage tank operators (refuelling) received training regarding possible fire risks and correct operating procedures	Proponent

Criteria	Objective	Mitigation	Monitoring	Responsible Body
		firefighting plan. All equipment and tools must comply with standards which allow certain tools and equipment near flammable sources. Safety distances must be adhered to as well as safe work procedures. Safety talks and job hazard analysis to be done before work starts. Firefighting measures as per the Material Safety Data Sheets of the product should be adhered to. All fuel storage and handling facilities in Namibia must comply with strict safety distances as prescribed by SANS. SANS is adopted by the Ministry of Mines and Energy as the national standardExperience has shown that the best chance to rapidly put out a major fire is in the first 5 minutes. It is important to recognise that a responsive fire prevention plan does not solely include the availability of fire fighting equipment, but more importantly, it involves premeditated measures and activities to timeously prevent, curb and avoid conditions that may result in fires. An integrated fire prevention plan should be drafted before construction commences.		
Noise	To reduce noise which may lead to hearing loss or allocate correct safety measures to prevent hearing loss. Prevention of nuisance noise to adjacent receptors.	Prevention of noise as a result of operations of trucks and heavy machinery which may lead to hearing loss. Prevention of nuisance noise to adjacent properties.	Any complaints received regarding excessive noise should be recorded with notes on action taken. If required a noise monitoring programme should be commenced. Noise complaints register to be kept and included in annual reporting.	Proponent
Dust	Excessive dust generated from the movement of heavy vehicles to and from the site, as well as the excavation of sand. This will be aggravated during periods of	Personnel must be issued with appropriately rated dust masks if required. No excavation to be conducted in excessively windy	Regular visual inspection. A complaints register must be maintained, in which any complaints from the	Proponent

Criteria	Objective	Mitigation	Monitoring	Responsible Body
	strong winds.	conditions. Dust suppression on haul roads and maintenance of such system to be conducted.	community must be logged. Complaints must be investigated and, if appropriate, acted upon. If required a dust monitoring programme should be commenced. All information and reporting to be included in an annual report.	
Waste Production & Management	Any waste which can include hazardous waste, such as hydrocarbons or domestic waste.	All waste produced on site must be removed and deposed at a recognized disposal facility. No dumping of waste should be allowed on site. Staff to receive training on waste disposal.	Any complaints received regarding waste should be recorded with notes on action taken. All data to be compiled in an annual report.	Proponent
Groundwater, Surface Water and Soil Contamination	Contamination from earthmoving vehicles and HMV through accidental fuel, oil or hydraulic fluid spills and / or leakages. Contamination from consumer fuel storage tank leaks / incorrect refuelling operations. Salinization of soil and ground water as a result of stagnant water where mining reaches the water table or pooling occurs	Adhere to the following procedures: ♦ All vehicles must be serviced and maintained regularly. ♦ All vehicles must be serviced and maintained regularly ♦ Vehicles may not be serviced at the quarry. ♦ 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. Specialists must be employed to determine the best mitigation procedures relevant to the problem if a large amount of pollution is recorded. Any polluted soil or water to be treated as a hazardous waste. The normal underground flow of water in the river as well as the periodic visible run-off and floods shall under no circumstances be polluted, blocked or deflected.	A report should be compiled every 6 months of all spills or leakages reported.	Proponent

Criteria	Objective	Mitigation	Monitoring	Responsible Body
		Mining may not take place within 2 m of the groundwater level. It is important that water level monitoring be implemented to ensure that the level of mining takes seasonal water level fluctuation into consideration.		
Poaching, Hunting or Removal of Plant Material	Personnel working on site may use the opportunity to illegally hunt or trap animals. Plant material may not be collected such as wood for fire making purposes.	All employees must be informed of the value of biodiversity. Rules and regulations regarding the illegal harvesting of natural resources from the surroundings must be made clear and the disciplinary steps that will be followed against perpetrators must be issued in writing and form part of the employee's contracts.	A report of any incidents reported should be complied every 6 months.	Proponent
Riverbed and Bank Erosion	Changing the flow of the river may lead to increased erosion. To prevent the removal of vegetation which anchors the soil to avoid possible soil erosion.	Mining must be limited to the riverbed and sand, stone and aggregate banks outside of the tree line as per the buffer zone. The river bed must be kept as smooth as possible to reduce turbulent flow. Estimated annual replenishment to be determined – only a volume equivalent to this may be extracted annually. Determining a "Red Line" – the ultimate site specific elevation up to witch mining may occur.	Mining plan kept on file. Mined out areas to be indicated on mine plan.	Proponent
Ecosystem and Biodiversity Impact	Removing of sediment from the river, may change the localised habitat in some areas along the river, should mining be conducted. Pooling and sedimentation (and erosion) may result from mining operations.	Mining must be limited to the riverbed and sand, stone and aggregate banks outside of the tree line as per the buffer zone. Soil should be sloped at an angle of less than 35° from the mined area to the base of the treeline (or any tree). Overburden (where applicable) must be stored in such a way as to prevent the unnecessary destruction of the environment surrounding the river (i.e. either in mined out areas or in areas still to be mined). The return of overburden to the mined out areas is essential in restoration of the areas. Topsoil may not be stored below the 50 year flood level. All mined out areas must immediately be rehabilitated and restored as close as possible to its original state. Mining operations should be delineated by clear beacons for all personal as not to infringe any further vegetation buffer zone.	Restoration plan on file and restoration plan to be executed within the first 3 years of operation. A report should be compiled every 6 months of all restoration performed. Mine plan kept on file indicating mined areas.	Independent specialist consultant (Restoration Ecologists); Proponent

Criteria	Objective	Mitigation	Monitoring	Responsible Body
		Excavation or mining may not expose the roots of the vegetation in any watercourse, especially native woody species. Mining must be limited to the riverbed and sand, stone and aggregate banks outside the tree line as indicated to be the mineable resource.		
River Morphology / Erosion	Removing sediment and established deposits may alter the flow regime of the river which may result in a change of the river morphology. This may be aggravated by the fact that less deposits may occur due to the possible upstream mining and damming.	Systematic strip mining of the sand, stone and aggregate deposits to be conducted. Limit in-stream mining methods to bar-skimming. All unused material to be uniformly levelled across the riverbed (not left in heaps around the site). Maintain river channel flood discharge capacity. Minimize activities that release fine sediment into the river. Should mining be conducted during low flow periods a buffer area should be maintained between the water and operations. Piles of unused material (soil, boulders plant material) (moveable material) which have previously been left in mined out areas should be flattened along the riverbed (evened out). Stockpile areas to be monitored for degradation (no additional material from surface to be taken apart from stockpiled reserves). Maintain river channel flood discharge capacity. No damming of flow allowed.	Mine plan to be kept indicating the mined out areas and future mining. Monthly inspections conducted on mining operations and any non-compliance documented. Incidents to be included in annual report.	Proponent
Visual Impact	This is an impact that affects the aesthetic appearance of the site being mined.	No dumping of waste should be allowed on site. Ensure rehabilitation of mined out areas in order to improve aesthetic appearance. The area where the removal of material takes place must be left clean and in a neat condition so that the view of the river is not blemished at any time.	A report should be compiled every 6 months of all complaints reported.	Proponent

Criteria	Objective	Mitigation	Monitoring	Responsible Body
Employment	Permanent employment will be provided while operations will contribute to sustainable employment in the brickmaking and construction industry.	Local Namibian's must be employed. Deviations from this must be justified.	Profiling of employees on their job responsibilities and achievements and reporting on these will portray the company as a people centred organisation.	Proponent
Heritage	The discovery of archaeologically or culturally important sites.	If such a site or any other archaeologically important artefact is found during the development phase any work in that area must be halted and the relevant authorities must be informed. These include; the Namibian Police and the National Monuments Council. Mining may only continue at that location once permission has been granted from the relevant authorities.	Record of any discoveries and proof of notifications to authorities on file. All information and reporting to be included in a final report.	Proponent
Skills, technology and development	Improved skills of employees in the region as employed by Super Sand: Mining operations.	Where skills exist local Namibians must be employed for the mine as well as the brickfield. Deviations from this must be justified. When training is provided, it should be certified or a managerial reference given.	Annual summary report based on actual training and the enhancement of skills and transfer of technology should be compiled when such training has been completed.	Proponent
Community Communication	Ambiguity and a lack of communication about the planned operations and related timing may result in community mistrust and grievances.	Information sharing regarding planned mining and related activities. A community liaison officer to be identified as person to accept grievances and provide key information to community leaders as enquired. Communication with various Governmental Ministries (those who haves vested interests).	Proof of communication kept on file.	Proponent
Health & Safety	Various health and safety risks present themselves as per the current and planned operations. Public health and safety mainly relate to traffic associated incidents (trucks from Super Sand operations travelling on public roads). Operational health and safety risks mainly pertain to the labourers.	All health and safety standards specified in the Labour Act should be complied with. Ensure that all staff members are briefed about the potential risks (such as and including flash floods) of injuries on site. Qualified operators to work with heavy machinery / trucks. Adhere to Health and Safety Regulations pertaining to personal protective clothing, first aid kits being available on site, warning signs, etc.;	Proof of health and safety training to be kept on file as per attendance register of training day to be kept with the material provided.	Proponent

Criteria	Objective	Mitigation	Monitoring	Responsible Body
		Selected personnel should be trained in first aid. The contact details of all emergency services must be readily available (two way radio provided for no-signal areas). Equipment that will be locked away on site must be placed in a way that does not encourage criminal activities (e.g. theft). Access to the locked away equipment should always be strictly controlled. No alcohol or recreational drugs are allowed on site. No labourers under the influence of either alcohol or recreational drugs should be allowed to conduct any work.		
Restoration/ Rehabilitation	Mined out areas must be rehabilitated as soon as possible to reduce safety impacts and restore vegetation to the area. It will be the right of the land owners to halt mining on the property, if practice, as agreed between the mining company and the land owner, is not being followed.	Restore the sites as close as possible to its original state after mining. Specific reference should be given to levelling and restoration of the areas where HMV have accessed the riverbed.	Restoration plan on file and restoration plan to be executed within the first 3 years of operation. A report should be compiled every 6 months of all restoration performed.	Independent Specialist Consultant (Restoration Ecologists); Proponent

8 DECOMMISIONING PHASE

Decommissioning of the sand mine is an ongoing process during the operations of the mine and not only an activity that should start at the time of mine closure. Rehabilitation/restoration of the mined out areas must be completed immediately and not be left for mine closure. This would decrease safety risks and allow the environment to recover more rapidly. All management actions as provided for the operational phase are valid up to decommissioning. At the time of mine closure Super Sand must ensure that the area has been successfully rehabilitated and that all waste, including polluted soil or water, has been removed and disposed of at an approved dumping site. No form of waste may be buried.

9 CONCLUSION

The above management measures, if properly implemented will help minimise adverse impacts on the environment. Where impacts occur, immediate action must be taken to reduce the escalation of effects associated with these impacts. To ensure the relevance of this document it must be reviewed on a regular basis.

This EMP 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, and parties responsible for transgression of the EMP should be held responsible for any rehabilitation that may need to be undertaken.

Monitoring reports and rehabilitation plans and results must be kept available for submission with future renewal applications for environmental clearance certificates. It is advised that an environmental consultant be involved in the monitoring and compilation of the monitoring reports and rehabilitation plans.

10 REFERENCES

Bosman Q, Botha P, V d Merwe J.A. 2016 June; Environmental Assessment for Sand Mining Operations in the Fish River, Karas Region: Scoping Report

Digital Atlas of Namibia Unpublished Report. Ministry of Environment & Tourism

Directorate of Environmental Affairs, 2008. *Procedures and Guidelines for Environmental Impact Assessment (EIA) and Environmental Management Plans (EMP)*, Directorate of Environmental Affairs, Ministry of Environment and Tourism, Windhoek.

National Planning Commission, 2012. Namibia 2011 Population and Housing Census – Preliminary Results.

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