

If you can't measure it  
You can't control it



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CC/2005/3576 (NAM)

APP: 001175

**SAND MINERS ASSOCIATION**  
**EMP Report**  
**for**  
**SAND MINING OPERATIONS**  
**in the Swakop River**

PROJECT NO: 2017/090/F

**Building towards better** **Safety**  
**Health**  
**Environment**  
**Quality**

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**STATEMENT PAGE**

**National Environmental Health Consultants CC** is an Approved Inspection Authority in terms of the Occupational Health and Safety Act (85 of 1993). (Certificate No.: CI 057 0H) SA and A.I.A 22/15 Namibia, **Labour Act, 1992 (Act 6 of 1992)** as amended under the **Labour Act 2007, (Act 11 of 2007)**.

J. Cornelissen, conducted this EIA and compiled this EMP on behalf of **National Environmental Health Consultants CC** and hereby declares that the results/findings given in the report are a true reflection of conditions encountered during the survey/observations on site.

Where relevant published and validated methods exist, they are always used in preference to novel methods. If a novel method is applied, a summary of validation and reference to the internal Standard Operating Procedure(s) is provided.

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12<sup>th</sup> May 2022  
**EMP REPORT DATE**

Date: 17 <sup>th</sup> of February 2022	Company: SAND MINERS ASSOCIATION – SAND MINING OPERATIONS IN SWAKOPMUND (EMP)	Occupational Hygienist Johan Cornelissen 	Project No: 2017/090/F
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Ministry of Environment,  
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Ministry of Labour,  
Industrial Relations and  
Employment Creation  
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**1. ENVIRONMENTAL MANAGEMENT PROGRAMME**

**1.1 Aims**

The aim of the Environmental Management Plan (EMP) is to detail the actions required to effectively implement the mitigation and management measures. These actions are required to minimize or avoid any negative impacts associated with the **Sand Miners Association’s** sand mining operations.

**1.2 Management and Mitigation Measures to Achieve Objectives**

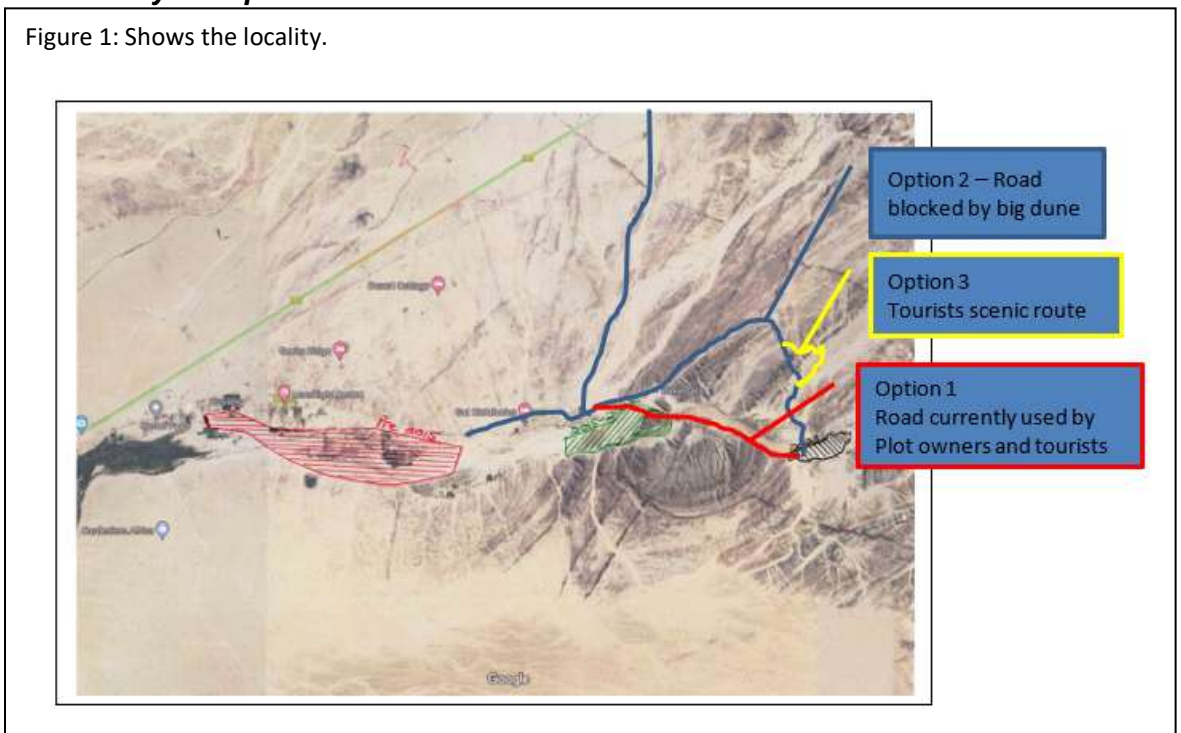
The management and mitigation measures to achieve the objectives relating to the various environmental issues, which are listed in tabular format, in **Section 2** below. The exploration manager is ultimately responsible for the implementation of this EMP. However, all members of the exploration team, are expected to understand the EMP requirements and to implement them.

**1.3 Introduction**

Please refer to the EIA for more detailed information.

**1.3.1 Locality and possible access roads**

Figure 1: Shows the locality.



**1.3.2 Background**

**National Environmental Health Consultants CC (NEHC CC)** has been appointed by the **Sand Miners Association** to conduct the Environmental Impact Assessment (EIA) and Environmental Management Process (EMP) in terms of the:

- Environmental Impact Assessments are regulated by the Ministry of Environment and Tourism (MET), in terms of the Environmental Management Act, 7 of 2007, which was promulgated and published in the Government Gazette No. 3966, on 27 December 2007; and
- The List of Activities that may not be undertaken without an Environmental Clearance Certificate and the Environmental Impact Assessment Regulations in

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terms of the Environmental Management Act, 7 of 2007, which were promulgated and published in Government Gazette No. 4878, on 6 February 2012.

The **Sand Miners Association** has been conducting and performing sand mining activities in the Swakop River for many years. The sand that's being mined by the **Sand Miners Association** is used in construction projects. The sand plays a vital role in construction projects, and is used for plastering, the making of concrete, brickmaking and the layering of foundations. The **Sand Miners Association** provides sand for construction industry throughout the coastal towns of Swakopmund, Walvis Bay and Henties Bay.

As indicated in the EIA Scoping Report, there has been a steadily increase in the undertaking of construction projects, which consequently, increased the usage of and the demand for sand, to be used in construction projects. It should be noted that no construction projects can be undertaken nor completed without a consistent supply of sand and the supplying of an adequate amount of sand. Therefore, it would not be feasible to prohibit the **Sand Miners Association's** sand mining operations in the Swakop River, as it would be detrimental for the overall economy of the country.

#### 1.4 Phases of the Project

The aim of this EMP is to derive mitigation measures, that should be implemented during the operational phase of the proposed sand mining activities at the current sand mining site as well as at the proposed new sand mining area.

The purpose of the EMP is to provide solutions to problems before they may occur. If adhered to, this EMP should limit corrective measures required during the operational phases of the sand mining activities.

Further mitigation measures will be implemented throughout the operational phase, if and when necessary, as required.

***The EMP deals with the following phases as detailed below:***

*Note: In light thereof, that the sand mining activities have been performed at the current sand mining site, since as far back as early 2015, the operational phase of the sand mining operations, are the only phase, which is relevant for the purpose of this report.*

##### 1.4.1 The Operational Phase


The potential environmental impacts which had arisen and which might still arise, during the operational phase of the sand mining activities, can be minimized, by identifying and implementing mitigation and management measures, and where possible proactive steps should be taken. In doing so, the risk of incidents occurring can be minimized and monitoring may be reduced, but will not be eliminated.

#### 1.5 Anticipated Environmental Impacts

Seeing that the sand mining activities are already being conducted, the observed and further anticipated adverse impacts, requiring mitigation relating to the biophysical and socio-economic environment, for the operational phase of the proposed sand mining activities, are listed below:

##### 1.5.1 Operational Phase - Adverse Impacts

- Noise pollution and intrusion;
- Visual intrusion;
- Traffic;

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- Atmospheric pollution;
- Ambient air quality;
- Safety and security;
- Groundwater and surface water contamination in the form of surface spillage of fuel, as well as groundwater and surface water resource reduction;
- Physical destruction of biodiversity and ecological processes and systems;
- Waste generation and disposal;
- Heavy vehicle traffic increase that could impact negatively existing infrastructure;
- Soil Erosion;
- Soil and Ground Water Pollution;
- Destruction of Flora & Fauna;
- Waste management;
- Increased hard surfaces & storm water run-off;

**1.6 Responsibilities**

As illustrated in the EIA Scoping Report, the **Sand Miners Association** is comprised of the following companies:


- Coastal Precast and Paving (CPP Suremix);
- Baard Group;
- Coastal Cement Works;
- Nambrick and Concrete;
- QE Construction;
- Erongo Quarries;
- Quality Sand and Stone;
- Premier Construction;
- Strydo Construction; and
- Refuse Construction.

Ultimate responsibility for implementation of the EMP lies with **Sand Miners Association**. This responsibility, in some instances may be delegated to contractors in the employ of **Sand Miners Association** for practical purposes, but **Sand Miners Association** will retain legal accountability. In that capacity, **Sand Miners Association** should delegate suitably qualified person(s) with the responsibility to ensure the implementation of the EMP, and who will:

- Know the contents and implications of the EIA and monitor the implementations of the EIA findings using the EMP;
- Guide, advise, and consult the contractors on environmental issues during decommissioning of the service station;
- Revise the EMP as required and inform relevant parties of the changes;
- Protect the environment.
- Integrating this EMP into the company specific EMP and to continuously update and improve the EMP, if and where appropriate;
- Regular inspections and auditing compliance to and with this EMP and any other relevant legal requirements, such as permits, authorizations and conditions of permits.
- Providing environmental training and awareness to all the staff, that are involved in the sand mining operations.
- Conducting and overseeing the environmental monitoring, set out in **Section 1.7** hereof; and
- Reporting any environmental issues.

Responsibility of the Service Providers and Contractors during the decommissioning of the service station is to:

- Ensure that all requirements of the EMP are communicated to, understood and followed by all persons working on the project who may have an impact on the environment;
- Ensure that a procedure exists for reporting incidents and resolving any problems rapidly;

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- Keep good records relating to the compliance/non-compliance with the conditions of the authorisation. These records must be made available to the relevant authority within seven days of a written request.

**To conclude:**

The Managing Directors and General Managers of each of the member companies, are responsible for the implementation of the EMP and the adherence thereto, and similarly, can be held liable and responsible, if they fail to do so. In order to assist the Managing Directors and General Managers with their obligations, duties and responsibilities in terms hereof, it is recommended that each of the member companies appoint an environmental officer, to manage and monitor the environmental issues and impacts, relating to each of their activities, in accordance with this EMP. It would be advisable that each member company, prepare their own individual EMP with their roles and responsibilities, in order to uphold the requirements of the overarching EMP compiled for the sand mining operations.

The general staff of the various member companies, whom conduct or perform any activity at the sand mining site, has the obligation and responsibility of adhering to the requirements, set out in this EMP.

**1.7 MONITORING**

**1.7.1 Groundwater**

A quarterly monitoring schedule is proposed in respect of the monitoring of the groundwater, where water levels and production data in selected farm and monitoring boreholes are measured. The water should also annually be sampled for laboratory analysis of major ions, total metals, hydrocarbon content, as well as bacterial analysis such as E-coli.

**1.7.2 Air Quality**

It is recommended that a dust fallout bucket be placed between the access road and the nearest receptor, to determine the dust fallout, as a result of the truck activity on the road. It is further recommended that two single dust fallout buckets be installed to monitor the dust fallout around the sand mining area. One dust fallout unit should be placed at the nearest receptor on the eastern sand mining area boundary, whilst the other dust fallout unit should be installed, at the nearest receptor on the western boundary. The dust fallout should be below 600mg/m<sup>2</sup>/day, not to be exceeded for more than three months or two consecutive months in a calendar year.

**1.8 ENVIRONMENTAL MANAGEMENT PROGRAMME**


The following tables form the core of this EMP for the operational phase of the sand mining operations. This table should be used as a checklist on site. Compliance with this EMP must be audited regularly.

**2. IDENTIFICATION OF ENVIRONMENTAL ASPECTS AND IMPACTS**

The sand mining activities of the **Sand Miners Association** have the potential, to impact the biophysical and socio-economic environment. Environmental aspects and potential impacts were identified during the screening and scoping phases, in consultation with authorities, Interested and Affected Parties and the environmental specialists.

The relevance of the potential impacts (“screening”) are also presented in **Table 1 and 2** below to determine if certain aspects need to be assessed in further detail. The potential impacts can also be assessed as part of this process.

**Table 1 and 2** below provides a summary of the environmental aspects and impacts associated with the sand mining operations of the **Sand Miners Association** in the Swakop River.


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## ENVIRONMENTAL MANAGEMENT PROGRAMME

Table 1: Operational Phase


TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	TARGETS TO MONITOR COMPLIANCE AND REPORTING THERE ON	RESPONSIBILITY	TIME FRAME
1. Review and approval of EMPr	To ensure sound environmental management on site	<ul style="list-style-type: none"> <li>The EMPr must be reviewed and approved by the deciding authority and any considerations deemed necessary by the said authority must be included.</li> </ul>	Approved EMPr	Ministry of Environmental Management (MET)	Operational phase
2. Duties of the Sand Miners Origination	The Sand Miners Origination remains ultimately responsible for ensuring that the operations proceed according to the requirements of the EMPr	<ul style="list-style-type: none"> <li>Include the EMPr in all documentation so that all the members of the Sand Mining Organisation is bound to the conditions of the EMPr.</li> <li>Take responsibility and the necessary actions required for restoring the environment in the event of negligence leading to damage of the environment.</li> <li>Appoint an independent Environmental Control Officer (ECO) during the operational phase to oversee all the environmental aspects relating to the operations.</li> <li>Provide the ECO with all reasonable assistance to facilitate effective monitoring.</li> </ul>	<p>Proof of communication of EMPr to all relevant members.</p> <p>Proof that financial means for restoration and rehabilitation are available should it be necessary.</p> <p>Appointment letter.</p> <p>Proof that all reasonable requests made by the ECO have been facilitated as far as possible.</p>	Sand Miners Origination	Operational phase

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TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	TARGETS TO MONITOR COMPLIANCE AND REPORTING THERE ON	RESPONSIBILITY	TIME FRAME
3. Review of the Sand Miner's Health and Safety Plan	<p>To ensure compliance with the regulations of the Namibian Labour Act (Act 11 of 2007) and the applicable Regulations.</p> <p>To ensure an operational site that is safe not only to workers, but also to the surrounding properties and the owners/residents</p>	<ul style="list-style-type: none"> <li>○ The Sand Miners must at all times comply with the requirements of the Namibian Labour Act (Act 11 of 2007) and the applicable Regulations.</li> <li>○ The Sand Miners must prepare and submit a Health and Safety Plan that addresses all aspects related to maintaining a safe and healthy environment, as per the requirements of the Namibian Labour Act (Act 11 of 2007) and the applicable Regulations.</li> <li>○ Emergency procedures must be produced and communicated to all employees on site. This will ensure that accidents are responded to appropriately and the impacts thereof are minimized. This will also ensure that potential liabilities and damage to the environment and lives are avoided.</li> <li>○ The nearest emergency service provider must be identified as well as its capacity and the magnitude of accidents it will be able to handle.</li> </ul>	<p>Safety Plan.</p> <p>Method Statements.</p> <p>Training Records.</p>	Sand Miners Origination	Operational phase
4. The EMPr	To ensure effective environmental management on site during all operations.	<ul style="list-style-type: none"> <li>○ This EMPr must be made binding to the Sand Miners Organisation as well as all their members.</li> <li>○ Contract with all relevant members to include penalties in the event of non-compliance with this EMPr. A penalty system will be devised prior to commencement of the operational phase.</li> </ul>	Proof of communication of EMPr to all relevant members.	Sand Miners Origination	Operational phase

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TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	TARGETS TO MONITOR COMPLIANCE AND REPORTING THERE ON	RESPONSIBILITY	TIME FRAME
5. Awareness of the workforce.	To ensure effective environmental management on site during all operations.	It is the Sand Miners Organisation's responsibility to ensure that the workforce is aware of and conforms to the environmental guidelines that are applicable in this EMPr.	Training Records	Sand Miners Origination individual members	Continuous
6. Record of environmental incidents	<p>To ensure that incidents are recorded and remedial action is taken that would restore the environment to acceptable conditions.</p> <p>To ensure quick and appropriate response to environmental incidents.</p> <p>To ensure adequate recordings of environmental incidents</p> <p>To prevent recurrence of similar incidents</p>	<ul style="list-style-type: none"> <li>o The Sand Miners Organisation's shall take corrective action to mitigate an incident appropriate to the nature and scale of the incident, immediately after the occurrence of the incident.</li> <li>o Residual environmental damage that remains after having taken corrective action shall be rehabilitated.</li> <li>o Change operating procedures where necessary to prevent recurrence of similar accident.</li> <li>o Record all incidents on an Environmental Incident.</li> <li>o Report, within 24 hours of the incident occurring.</li> <li>o Additional documents, including photos shall be appended to the incident report to provide a comprehensive record of the incident and the corrective and preventative action taken. Failure to do so shall result in a penalty.</li> </ul> <p>All incidents will be investigated in collaboration with the ECO. The focus of these investigations shall not be to apportion blame to specific employees, but to ascertain the root cause of the incident and to prevent a recurrence of similar incidents.</p>	Environmental Incidents Report	Sand Miners Origination individual members	Continuous

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Environmental Impact – Continua	Management and Mitigation Measures
7.Social and third-party safety issues	<ul style="list-style-type: none"> <li>- The working hours for the sand mining operations are from Mondays to Fridays, from 07:00 AM to 17:30 PM, and on Saturdays from 07:00 AM to 13:30 PM. No work will be conducted or performed on Sundays and public holidays. It is recommended that the sand mining activities should be limited on Saturdays, as well as after 17:30 PM on weekdays.</li> <li>- No sand mining activities should be performed within 200 meters from any private property.</li> <li>- The <b>Sand Miners Association</b> should designate a person, to act and function as liaison between the plot owners and the staff of the sand mining operations. The liaison’s contact details should be readily available and easily accessible.</li> <li>- No poaching or plant theft will be allowed or tolerated. Any person who acts in contravention hereof, will be prosecuted to the fullest extent of the law.</li> <li>- All the staff whom works and operates at or on the sand mining site, will be provided with identification and proof that they are employed by the <b>Sand Miners Association</b> and that they are authorized to be on site. The <b>Sand Miners Association</b> will ensure that all the staff have their identification on them at all times, whilst on site, and that such identification is displayed in a prominent manner.</li> <li>- Areas on the sand mining site will be designated for smoking and smoking will only be permitted and allowed in the said designated smoking areas.</li> <li>- The <b>Sand Miners Association</b> will implement, maintain and enforce, a zero-tolerance alcohol policy in the workplace and on site.</li> <li>- Adequate and appropriate toilet and ablation facilities should be erected, managed and maintained for the employees on site. The employees must be enforced and obligated to strictly use these ablation and toilet facilities. These facilities, shall not discharge any effluent into the environment. The <b>Sand Miners Association</b> must ensure that sewage needs to be emptied on a regular basis, to prevent overflowing, and be discharged at the Swakopmund municipal sewage facility.</li> <li>- All the waste which has been generated by the staff of the <b>Sand Miners Association</b> to date, as a result of the unavailability of ablation and toilet facilities, shall be cleaned up and properly and responsibly disposed of.</li> <li>- All the vehicles and trucks used in the sand mining operations, shall strictly, only make use of the dedicated access road, when travelling to and from the sand mining site. No <b>Sand Miners Association</b> vehicles shall utilize the plot road for access to the sand mining site.</li> <li>- It is highly recommended that safety and speed reduction measures be implemented and installed at the intersection of the access road to the sand mining site and the plot road. Safety and speed reduction measures, such as boom gates or speedhumps can be used. This will assist with the management and mitigation of risks to both the staff of the <b>Sand Miners Association</b> as well as third parties, utilizing the plot road. If any of the <b>Sand Miners Association</b> employees do not adhere thereto, criminal prosecution and disciplinary action, must be instigated.</li> <li>- The <b>Sand Miners Association</b> shall liaise with the Roads Authority, to ensure that the access road turn-off, from and unto the B2, which is being used by the vehicles of the sand mining operations, conform to all the necessary road safety requirements, such as road traffic signs and designated speed limits.</li> <li>- The <b>Sand Miners Association</b> will control and regulate the movement of all of their staff on the sand mining site, and prevent any staff from leaving their designated work areas.</li> <li>- The <b>Sand Miners Association</b> will furthermore, ensure that warning signs are erected and posted at all the sand mining site boundaries, and will ensure that these warning signs are maintained.</li> </ul>
8.Tourism	<ul style="list-style-type: none"> <li>- The <b>Sand Miners Association</b> must ensure that the existing access into the Swakop River, from the plot road, is not compromised and that the access, is safely maintained.</li> </ul>

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Environmental Impact – Continua	Management and Mitigation Measures
	<ul style="list-style-type: none"> <li>- The eastern boundaries of the sand mining site, shall be limited to the proposed area, presented in the schematic illustration in Figure 3 below.</li> </ul>
9.Visual	<ul style="list-style-type: none"> <li>- The existing footprint of the sand mining area will be limited to the area where the current footprint already exists, and shall be minimized as far as is practically and reasonably possible.</li> <li>- In order to suppress dust and to reduce the visual impacts resulting from the dust, it is recommended that a water cart be used to spray water on the access road, which leads to the sand mining site, as well as on the roads inside the sand mining area.</li> <li>- The 'Big Tree' picnic area and the immediate surrounding area, must remain untouched. The <b>Sand Miners Association</b> will help with the maintenance of the picnic area.</li> <li>- The <b>Sand Miners Association</b> will initiate a general clean-up of the immediate area, surrounding the sand mining site and liaise further with the management of the national parks, for a further and additional contribution, towards further clean-up initiatives.</li> <li>- Sand mining activities north-west of the rock island, where thicker vegetation is growing, as well as along the access road, on the eastern side of the rock island, shall be avoided. Therefore, the eastern boundaries of the sand mining operations, shall be limited to the proposed area, as depicted in the schematic illustration in Figure 3 below.</li> <li>- By implementing the other management and mitigation measures, as set out in this EMP, most of the visual impacts and the impacts on the 'sense of place', will be minimized.</li> </ul>
10.Waste Management	<ul style="list-style-type: none"> <li>- No littering or accumulation of waste will be permitted on the sand mining site.</li> <li>- Waste material on the sand mining site and on the immediate surrounding area, may not be burned or buried, under any circumstances.</li> <li>- Suitable receptacles for waste disposal will be provided at appropriate locations at the sand mining site. These receptacles will be clearly marked for the different types of waste.</li> <li>- The employees of the <b>Sand Miners Association</b> must and will be shown the importance of the correct disposal of waste, as well as be provided with training in respect of the minimization and recycling of waste.</li> <li>- All the waste will be properly removed from the sand mining site and be disposed of at a suitable and licensed waste disposal facility. The suitable and licensed waste facility will depend on the nature of the waste. Non-hazardous waste, will be disposed of, at the Swakopmund landfill site, whilst, hazardous waste will be disposed of at the Walvis Bay hazardous waste facility.</li> <li>- Written evidence and record of every waste removal and disposal will be kept, stored and retained.</li> </ul>
11.Groundwater and surface water	<ul style="list-style-type: none"> <li>- Groundwater resources can be managed by utilizing a buffer zone of sand of at least 1 meter above the water table. This implies that the sand mining operations will be restricted to a maximum of 3 meters, vertically down, from the original river, being the natural ground level, at the current water level.</li> <li>- The water levels should be constantly monitored to assure that an adequate buffer zone is and remains present at all material times.</li> <li>- After the occurrence of a flood event, the water level will have to be reassessed and re-evaluated, as the vertical extent of the excavated sand pit, may need to be decreased.</li> <li>- In the event that water levels significantly drop in the boreholes of the neighboring properties, as a result of the sand mining activities, to such an extent, that it affects the pumping capacity of the farmers in the surrounding area, then the <b>Sand Miners Association</b> must provide an alternative and adequate water source, which could potentially require the drilling of</li> </ul>

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Environmental Impact – Continua	Management and Mitigation Measures
	<p>new production boreholes, or the supplying of water from the NamWater pipeline or from other sources. The natural water decline and the abstraction by farmers, are not to be considered, and are to be excluded, as a reason through regular water level and abstraction monitoring.</p> <ul style="list-style-type: none"> <li>- It is recommended that the upstream and downstream groundwater resource levels be monitored, on a quarterly basis.</li> </ul>
12.Aquifer thickness	<ul style="list-style-type: none"> <li>- In order to manage the reduction in the aquifer thickness, additional monitoring both upstream and downstream of the sand mining site, is recommended.</li> <li>- The <b>Sand Miners Association</b> will liaise with MAWF, to obtain the necessary authorization.</li> </ul>
13.Surface water runoff	<ul style="list-style-type: none"> <li>- In order to manage the surface water runoff, for small flood events, its is recommended that an area on the southern side of the sand mining site, be left untouched, so that a series of flood diversion berms and barriers can be constructed, to channel small floods, around the sand mining excavations, in order for the small floods, to continue flowing downstream, without flooding the excavation, thus, allowing for a shorter period of stoppage of the sand mining activities. To ensure that this is sustainable, it would mean that the southern arm of the proposed sand mining area, would have to be left as a stormwater channel, to allow floods to pass down the Swakop River. Figure 2, shows the proposed route for small floods, is indicated by the yellow line along the southern boundary of the sand mining site.</li> <li>- However, access for the people driving in the Swakop River, has to be maintained.</li> <li>- A communication system is to be implemented, which alerts the employees of the arrival of flood waters in the Swakop River. Upon receipt of such a notification, all sand mining operations are to be ceased with immediately and all equipment is to be removed from the excavated pits. The sand mining operations are only to be resumed when communication has been issued and received that the flood has passed.</li> </ul>
14.Groundwater and surface water quality	<ul style="list-style-type: none"> <li>- Dedicated storage and refueling stations for heavy vehicles to be erected in an area, where ground protection can be provided, to prevent oil, fuel and grease spillages, seeping into the soil and the groundwater, and this refueling station should be situated outside of the river area.</li> <li>- Pollution will be prevented and mitigated, through basic infrastructure design and the thorough and regular maintenance of all sand mining equipment and vehicles.</li> <li>- Spill kits will be readily available throughout the sand mining site and all employees will be properly and adequately trained on the usage of these spill kits, to enable the containment and remediation of any pollution incidents on the sand mining site.</li> <li>- All <b>Sand Miners Association</b> staff must be provided with environmental awareness training and records of the training provided to the staff must be kept, stored and retained.</li> <li>- Any and all spills will be contained and properly cleaned-up, immediately after the occurrence thereof.</li> <li>- Appropriate and adequate ablution and toilet facilities must be provided to all the <b>Sand Miners Association</b> employees on the sand mining site and all the employees must be strictly enforced to make use of these facilities, rather than making use of the surrounding environment. These facilities, will however, not discharge any effluent into the surrounding environment. The sewerage needs to be emptied on a regular basis, in order to prevent overflowing, and must be discharged at the Swakopmund Municipal sewerage facility.</li> <li>- It is recommended that additional monitoring be implemented, both upstream as well as downstream of the sand mining site.</li> </ul>

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Environmental Impact – Continua	Management and Mitigation Measures
15. Air quality	<ul style="list-style-type: none"> <li>- As already indicated hereinabove, it is recommended that a water cart be used to spray water on both the access road leading to the sand mining site, as well as the roads inside the sand mining area, in order to suppress dust.</li> <li>- The dust fallout from both the access road as well as the sand mining operations should be monitored.</li> <li>- In the event that the dust fallout exceeds 600 mg/m<sup>2</sup>/day, for more than three months and more than two consecutive months in a calendar year, additional mitigation measures, such as chemical suppressants or salt on the road surfaces, should be considered. The dust suppression, in the form of water sprays, should be considered for the sand mining activities, should these levels be exceeded.</li> <li>- The maximum speed limit, which the sand mining vehicles are to travel, is 30km/h near houses and settlements, whilst a maximum speed limit of 60km/h will be imposed on the access road, leading to the sand mining site.</li> <li>- All sand mining vehicles and equipment will be maintained in a good and proper working condition and order.</li> </ul>
16. Biodiversity	<ul style="list-style-type: none"> <li>- The footprint of the sand mining area will be minimized as far as reasonably and practically possible.</li> <li>- All the waste generated during the sand mining operations must be removed from the sand mining site and be properly and appropriately disposed of.</li> <li>- The cutting down of protected tree species or trees with a stem diameter of over 10 cm, should be prevented and avoided, as far as practically possible. The required tree removal permits, as statutory required by the Forestry Act, will be obtained prior to the removal of any and all protected tree species.</li> <li>- For the cutting, removing or destroying of any tree, bush or shrub growing within 100 meters of the river, will require permits in order to do so, as stipulated in the Forestry Act.</li> <li>- The sand mining activities north-west of the rock island, where thicker vegetation is growing, shall be avoided. Therefore, the eastern boundaries of the sand mining operations, within the proposed area, shall be limited to the area, as presented in the schematic illustration, in Figure 3 below.</li> <li>- The <b>Sand Miners Association</b> will implement a zero-tolerance policy in respect of the killing or collecting of any biodiversity. This policy will apply to all the employees and contractors working on the sand mining site.</li> <li>- No open fires will be permitted on the sand mining site.</li> <li>- All employees and contractors will be shown the value of biodiversity and the need and importance of the conservation of species and ecosystems, that occur within the Dorob National Park as well as in the Namib-Naukluft National Park, through appropriate training.</li> <li>- The imposed speed limits on the access roads as well as the roads within the sand mining area, will be strictly enforced, in order to prevent road kills.</li> <li>- The <b>Sand Miners Association</b> must ensure that their park entry permit is up to date and that all the employees and contractors adhere to the rules and regulations of the aforementioned National Parks.</li> <li>- Ensure that guidelines and rules and regulations, are regularly communicated to the employees of the sand mining operations, as well as to all the visitors to the sand mining site. This must be further enforced with appropriate signage.</li> <li>- Any animals that are accidentally killed as a result of the sand mining activities, has to be reported to the MET: DPW immediately, after the occurrence thereof.</li> </ul>
17. Noise	<ul style="list-style-type: none"> <li>- The sand mining activities are to be restricted to daylight hours and no sand mining activities are to be conducted on Sundays or public holidays.</li> <li>- All registered noise complaints are to be documented and investigated and every effort is to be made to address the area of concern where ever reasonably and practically possible.</li> </ul>

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Environmental Impact – Continua	Management and Mitigation Measures
	<ul style="list-style-type: none"> <li>- Further and once-off noise monitoring campaigns are to be performed as and when required.</li> <li>- The approved access road, should be used and utilized by the sand mining vehicles. The plot road should not be used, as far as reasonably possible.</li> <li>- The sand mining vehicles, equipment and machinery are to be operated in such a manner, that there is proper minimization of noise emissions.</li> <li>- All sand mining equipment and machinery are to be serviced on a regular basis, and must be maintained in a good and proper working condition.</li> <li>- The following measures are good practices, which are to be considered only:                         <ul style="list-style-type: none"> <li>➤ All the machinery and equipment used at and on the sand mining site, are to be fitted with effective exhaust silencers and are to be maintained in a good working order to meet the manufacturers’ noise rating levels;</li> <li>➤ Defective silencers should be replaced immediately; and</li> <li>➤ Equipment and machinery which is only used intermittently, should be shut down and switched off, when not in use.</li> </ul> </li> </ul>
18.Land use	<ul style="list-style-type: none"> <li>- The existing power lines and related servitude, cuts through the sand mining site, and needs to be taken into consideration, when the sand mining operations move closer to this area.</li> <li>- No sand mining operations are to be conducted within the area of the servitude, and must remain at a safe and appropriate safe working distance from the powerlines and their associated infrastructure. The <b>Sand Miners Association</b> must confirm this with both NamPower as well as Erongo Red.</li> <li>- To avoid the powerlines and related servitude areas, the access to the eastern portion of the sand mining area, will be from the junction where the ‘plot road’ enters into the Swakop River. <b>See Figure 1.3.1 Above.</b></li> <li>- All the sand mining vehicles travelling along this section of the ‘plot road’ in order to access the sand mining site, from the south, shall travel at a speed of maximum 30km/h and will give right of way to the other vehicles utilizing this portion of the road.</li> </ul>

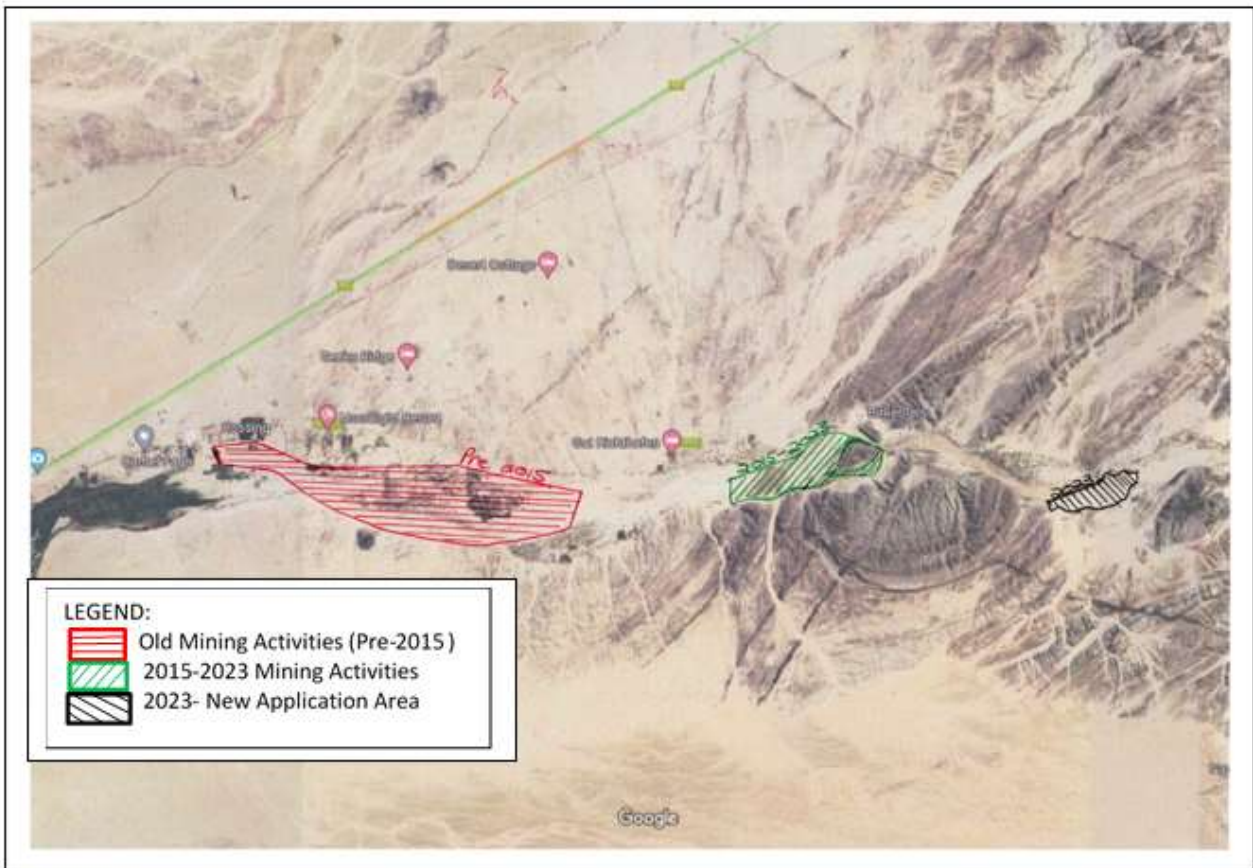
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**Table 2: Closure and Rehabilitation**

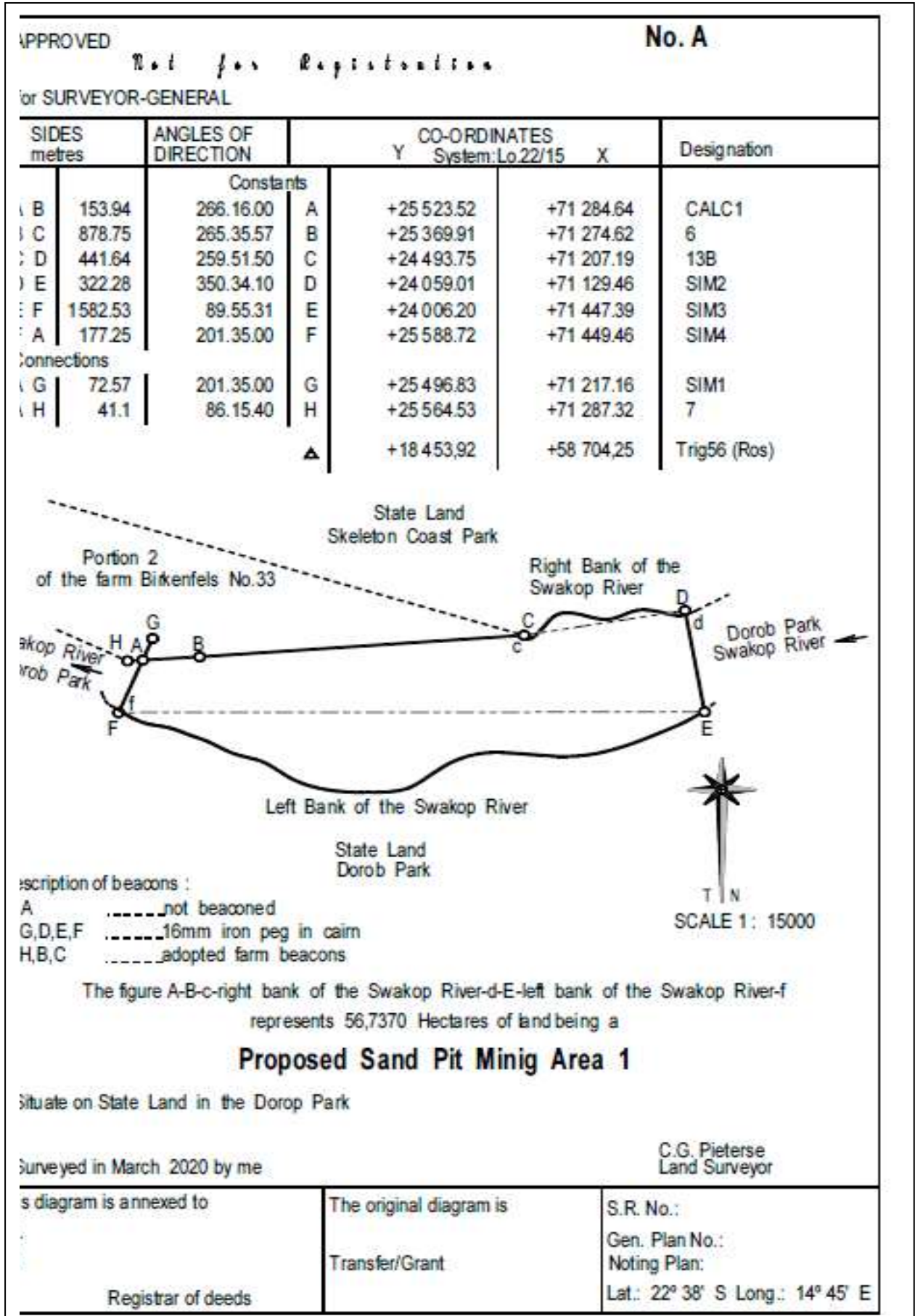
Environmental issue	Management and Mitigation Measures
1. Groundwater	<ul style="list-style-type: none"> <li>- Once the resource has been depleted in the current sand mining area, rehabilitation should be conducted, in order to avoid any negative impacts on the aquifer. The rehabilitation process should include backfilling of relevant sections and/or the levelling of the sand mining area to avoid the ponding of surface water in the abandoned excavated sand mining pits, as were observed at the old sand mining site.</li> </ul>
2. Third party safety issues	<ul style="list-style-type: none"> <li>- The final excavated sand pits will be rehabilitated in such a way and manner that they will be made safe and visually more acceptable, to ensure that they no longer pose a risk to the safety of third parties or animals.</li> </ul>
3. Contamination of Soil	<ul style="list-style-type: none"> <li>- Dedicated storage and refueling stations for heavy vehicles are to be erected in an area, where ground protection can be provided, to prevent oil, fuel and grease spillages, seeping into the soil and the groundwater, and this refueling station should be situated outside of the river area.</li> <li>- Pollution will be prevented and mitigated, through basic infrastructure design and the thorough and regular maintenance of all sand mining equipment and vehicles.</li> <li>- Spill kits will be readily available throughout the sand mining site and all employees will be properly and adequately trained on the usage of these spill kits, to enable the containment and remediation of any pollution incidents on the sand mining site.</li> <li>- All <b>Sand Miners Association</b> staff must be provided with environmental awareness training and records of the training provided to the staff must be kept, stored and retained.</li> <li>- Any and all spills will be contained and properly cleaned-up, immediately after the occurrence thereof.</li> <li>- Appropriate and adequate ablution and toilet facilities must be provided to all the <b>Sand Miners Association</b> employees on the sand mining site and all the employees must be strictly enforced to make use of these facilities, rather than making use of the surrounding environment. These facilities, will however, not discharge any effluent into the surrounding environment. The sewerage needs to be emptied on a regular basis, in order to prevent overflowing, and must be discharged at the Swakopmund Municipal sewerage facility.</li> </ul>
4. Air quality deterioration	<ul style="list-style-type: none"> <li>- In order to combat the deterioration of air quality, all sand mining vehicles moving to and from the sand mining site, or within the sand mining site, will adhere to the imposed speed limit of 30km/h near houses and settlements; and 60km/h on the access road, leading to and from the sand mining site.</li> <li>- The movement of drilling related vehicles on unpaved access roads, will be on a small scale.</li> </ul>
5. Soil erosion	<ul style="list-style-type: none"> <li>- The impacted footprint areas, around the excavated pits, shall be ripped and raked, to encourage re-vegetation.</li> </ul>
6. Waste Management and Infrastructure	<ul style="list-style-type: none"> <li>- All sand mining infrastructure and equipment, are to be removed from the sand mining site.</li> <li>- The ablution and toilet facilities are to be decommissioned.</li> <li>- Ensure that all waste generated during the sand mining operations are removed from the sand mining site, and disposed of in an appropriate fashion.</li> </ul>
7. "Old sand mining areas"	<ul style="list-style-type: none"> <li>- Although the 'old sand mining areas', located further downstream, do not form part of the scope of this EIA and EMP process, the lack of proper rehabilitation of these areas was raised by various Interested and Affected Parties, and was also noted by the environmental team. It is therefore, advised, that these areas, also be rehabilitated by the <b>Sand Miners Association</b>.</li> </ul>

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**FIGURE 2.1-1: REGIONAL SETTING OF THE SAND MINE / OLD, CURRENT AND PROPOSED NEW AREA OF THE SAND MINING ACTIVITIES**

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**FIGURE 2.1-2: SURVEYED AREA OF THE PROPOSED NEW SAND MINE SITE**

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**ANNEXURE B: COMPLAINTS RECORD SHEET**

RECORD OF COMPLAINTS	PAGE	OF	DATE: / /
Complainant:			
Capacity of complainant:			
Complaint recorded by:			
Complaint:			
Corrective measure:			
ECO:			Date:
Notes by ECO:			