

# POWER STONE CC

## ENVIRONMENTAL MANAGEMENT PLAN

For the proposed borrow pit for the extraction of River sand, near Swakopmund, Erongo Region



EARTH  
ENVIRONMENTAL  
SERVICES

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## **1. Introduction**

This Environmental Management Plan (EMP) provides the operational framework for managing, mitigating, monitoring and rehabilitating environmental impacts associated with the proposed river material borrow pit near Swakopmund, Erongo Region. The EMP translates the findings of the approved Environmental Impact Assessment (EIA) into clear, enforceable site-level controls.

The EMP applies to the proponent, contractors, subcontractors and all personnel operating within the project footprint and associated access routes. Compliance with this EMP and the Environmental Clearance Certificate (ECC) conditions is mandatory for all phases of the project.

## **2. Project Description (Operational Summary)**

The proposed activity involves light-touch surface extraction of compacted river soils through controlled scraping, without creating deep excavations or permanent pits. Extraction will not exceed a depth of 1.5 m, and much of the work will occur close to natural ground level to maintain the integrity of the landscape. No activities, vehicle movement, stockpiling or temporary facilities may occur outside the surveyed and approved borrow pit footprint and authorised access routes.

### **2.1. Location, Site Description, Land Use and Infrastructure**

#### **2.1.1. Project Location**

The project area is located approximately 8 km east of Swakopmund, within the Dorob National Park. Access to the site is gained via the C28 road, followed by an existing gravel track leading directly to the demarcated extraction area. The proposed river sand borrows pit covers a footprint of approximately 0.34 ha (Figures 1–2).

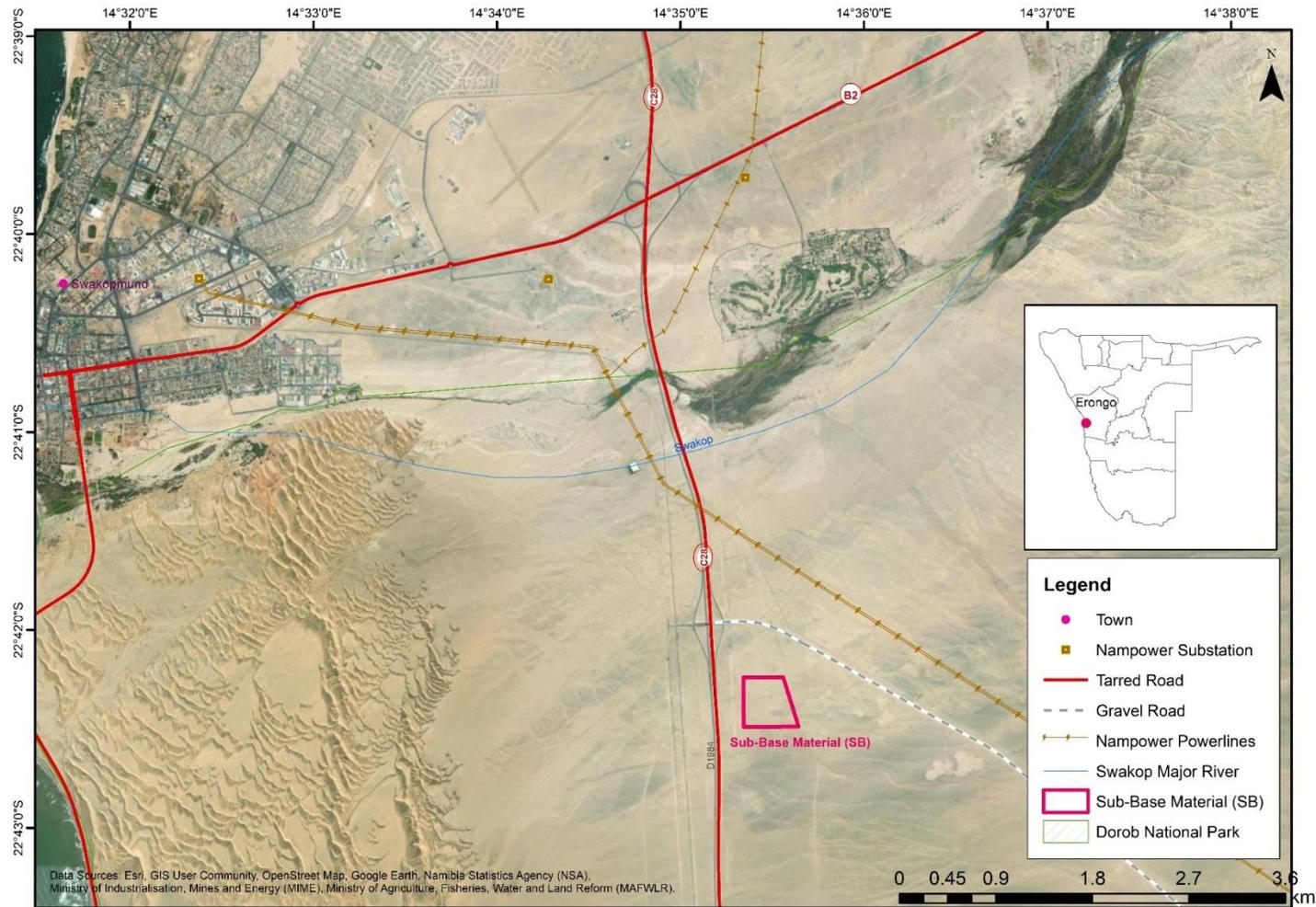


Figure 1: Locality map and infrastructure of the proposed project

### 3. Project Activities

#### 3.1. Overview

The proposed project involves the extraction of river sand from a designated borrow pit located within a dry, non-perennial riverbed near Swakopmund. The activities will follow a phased and low-impact development approach that includes site preparation, controlled extraction, loading and hauling, and progressive rehabilitation. The operational sequence is outlined below.

**Initial On-Site Preparation and Demarcation:** Prior to the commencement of extraction activities, the Proponent will undertake pegging and surveying to clearly demarcate the approved extraction footprint. Site preparation activities will include:

- Gaining access via existing tracks only
- Installing appropriate safety and warning signage
- Clearing limited vegetation within the approved footprint where necessary
- Stripping and temporarily setting aside top soil, where present, for use during rehabilitation

River sand extraction will be undertaken using a controlled surface scraping method, resembling shallow shaving of the natural ground surface rather than deep excavation. The following activities will apply:

**Scraping of Surface Layers:** Excavators, graders, and front-end loaders will remove thin layers of river sand, with extraction limited to a maximum depth of 1.5 m. Operators will maintain gently sloping profiles to preserve the natural landform and ensure safe access.

**Loading and Temporary Stockpiling:** Extracted sand will be moved into small, temporary stockpiles or directly loaded into tipper trucks for transport to construction sites. Stockpiling, where required, will be short term and confined within the approved footprint.

**Material Handling:** No blasting, chemicals, washing, or wet processing will be undertaken. All operations will rely on diesel-powered mobile machinery, and no permanent infrastructure or long-term facilities will be established on site.

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Extraction activities will rotate across small working areas within the approved polygon. This approach minimises the extent of active disturbance at any given time and allows natural wind-driven processes to assist in levelling and stabilising worked surfaces.

The Proponent is committed to ensuring that all extraction activities remain low impact, controlled, and fully reversible. Progressive rehabilitation will be implemented throughout the operational period and will include reshaping disturbed areas, respreading of stored topsoil where available, and smoothing of surface profiles to avoid artificial depression or steep edges.

Clear and ongoing communication will be maintained with relevant authorities and stakeholders throughout the project lifecycle to ensure that operations remain compatible with conservation objectives, tourism use, and other land uses within Dorob National Park.

#### **4. Compliance With Legal Requirements**

The project is subject to national environmental and resource-use legislations. Key legislation includes:

- Environmental Management Act, 2007 and EIA Regulations, 2012 – Environmental Clearance Certificate required
- Parks and Wildlife regulations applicable to Dorob National Park – Park access authorisation
- Minerals (Prospecting and Mining) Act, 1992 – Regulation of resource extraction
- Water Resources Management Act, 2013 – No abstraction proposed
- Hazardous Substances Ordinance, 1974 – Control of fuels and lubricants
- National Heritage Act, 2004 – Chance Finds Procedure

All permits and approvals must be obtained prior to commencement of activities.

## 5. Key Environmental Risks Relevant to Management

Based on site conditions and EIA findings, the following risks require active management:

- Dust generation due to arid climate and wind conditions
- Visual disturbance within a tourism and conservation landscape
- Soil disturbance and slow natural recovery
- Uncontrolled vehicle movement and track proliferation
- Accidental spills from mobile machinery
- Inadequate rehabilitation leading to long-term scarring

No sensitive habitats, drainage lines or groundwater resources occur within the approved footprint.

## 6. Environmental Management Principles

To ensure sustainable exploration activities and regulatory compliance, the following environmental management principles will be adhered to:

Table 1: Project Goals and Descriptions

TERM	DESCRIPTION
<b>Accountability and Commitment</b>	Senior management and supervisors are responsible for ensuring the health and safety of personnel, and for preventing or minimising environmental impacts arising from borrow pit activities.
<b>Competence</b>	The proponent will maintain a trained and environmentally aware workforce through appropriate recruitment, induction, and ongoing training.

<b>TERM</b>	<b>DESCRIPTION</b>
<b>Risk Assessment, Prevention and Control</b>	Environmental risks will be identified, assessed, and prioritised so that appropriate control measures can be planned, resourced, and implemented. Prompt corrective action will be taken if impacts occur.
<b>Performance and Evaluation</b>	Clear environmental objectives and performance indicators will be set. Compliance with relevant laws, permit conditions, and internal standards will be monitored and reported.
<b>Stakeholder Consultation</b>	The proponent will maintain open communication with authorities, neighbouring land users, and other interested parties, ensuring transparency and mutual understanding.
<b>Continual Improvement</b>	Performance will be reviewed regularly to identify opportunities for improvement in environmental protection and social well-being.
<b>Financial Provisions</b>	In line with the polluter pay principle, the proponent will make the necessary financial provisions to implement and maintain the EMP, including rehabilitation obligations.

## **7. Environmental Performance Management**

Environmental performance will be managed through routine observation, simple record keeping and immediate corrective action, appropriate to the short-term and intermittent nature of the borrow pit operations. The objective is to ensure that environmental control remains effective during active work periods and that any emerging issues are addressed without delay.

The following performance aspects will be monitored:

### **7.1. Waste Management Plan**

Waste generation on-site will be minimal and strictly controlled. All waste will be collected immediately, stored securely, and transported to approved municipal disposal or recycling facilities. No dumping, burning, or stockpiling of waste will occur at the borrow pit, and the site will be cleaned daily to prevent environmental contamination.

### **7.2. Hazardous Substances and Fuel Management Plan**

No hazardous materials or fuel will be stored on-site. All refueling and maintenance will take place in town. Machinery will carry only its operational fluids, and spill kits will be kept in vehicles as a precaution. Any accidental leaks will be contained and contaminated soil removed, ensuring the borrow pit remains free from hazardous contamination.

### **7.3. Visual Impact Mitigation**

To maintain the natural desert aesthetic important for tourism, all activities will be kept as low-profile as possible. Machinery and stockpiles will remain within the demarcated footprint. Stockpiles will be shaped to low angles. Machinery will be parked in visually unobtrusive areas when possible. Rehabilitation will focus on restoring natural micro-topography to ensure the land blends back into the surrounding gravel plains.

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#### 7.4. Dust Management

Dust will be controlled through operational measures such as speed limits and work scheduling. Visible dust emissions will be checked during active operations, particularly during windy conditions. Where excessive dust is observed, activities will be adjusted or temporarily suspended until conditions improve.

#### 7.5. Noise Management

Noise will be managed by restricting operations to daylight hours and maintaining equipment in good working condition. Noise levels will be monitored through worker observation to ensure that equipment operation does not cause unnecessary disturbance or unsafe exposure.

#### 7.6. Soil Stability and Erosion Control

Disturbed surfaces and access routes will be inspected to confirm that soil remains stable and that no rutting, gulying or uncontrolled erosion is occurring. Where instability is observed, surfaces will be reshaped and stabilised as soon as practicable.

#### 7.7. Emergency Preparedness and Response Plan

Emergency preparedness will include first aid capability, fire management and spill response. A trained first aider will be present on site at all times. Vehicles will carry first aid kits and communication devices.

Fire risks will be low due to the absence of vegetation cover, but spark-producing activities will be controlled and monitored. Fire extinguishers will be placed in vehicles and near fuel storage. Open flames are prohibited.

The spill response plan will include immediate containment, stopping the source of the spill, notifying the environmental officer and removing contaminated soil. In the event of an injury or major incident, emergency numbers for local services will be included in the site information file.

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## 7.8. Rehabilitation Performance

Rehabilitation will be implemented progressively. Worked areas will be reshaped and stabilised to reinstate natural contours and surface texture consistent with the surrounding gravel plains. Rehabilitation success will be confirmed visually prior to demobilisation.

## 7.9. Compliance Management

Compliance with the EMP and ECC conditions will be monitored throughout operations. Any non-compliance identified will be corrected immediately, with actions recorded and followed up to closure.

## 7.10. Compliance and Reporting Framework

The environmental officer will maintain a file containing all monitoring data, training logs, incident reports, waste manifests and rehabilitation records. Biannual reports will be submitted to MEFT demonstrating compliance with ECC conditions.

Non-conformances will trigger corrective action within a specified time frame. Major incidents will be reported immediately to relevant authorities.

# 8. Environmental Human Resources

Environmental Human Resources ensure that personnel working on the project comply with environmental regulations, safety procedures, and sustainability practices. Properly trained and informed staff are essential to minimise impacts, maintain compliance, and implement corrective measures when necessary.

## 8.1. Roles and Responsibilities for Environmental Management

Table 2: Roles and Responsibilities for Environmental Management

Role	Responsibilities (Adapted for Borrow Pit Operations)
<p><b>Project Manager (PM)</b></p>	<ul style="list-style-type: none"> <li>• Overall responsibility for EMP implementation and environmental compliance.</li> <li>• Allocates resources for environmental monitoring, rehabilitation, and waste management.</li> <li>• Appoints and supervises the Environmental Officer (EO).</li> <li>• Issues corrective actions and ensures compliance with regulatory conditions and the Environmental Clearance Certificate (ECC).</li> </ul>
<p><b>Contractor’s Site Manager (CSM)</b></p>	<ul style="list-style-type: none"> <li>• Oversees daily operations including excavation, stockpiling, loading, and hauling.</li> <li>• Ensures borrow pit activities remain within demarcated areas.</li> <li>• Conducts routine inspections to identify dust, erosion, waste, or spill risks.</li> <li>• Enforces speed limits, safe driving, and traffic control measures.</li> <li>• Reports environmental risks or incidents to the EO and PM.</li> </ul>
<p><b>Environmental Officer (EO) / HSE Officer</b></p>	<ul style="list-style-type: none"> <li>• Monitors and enforce EMP implementation on-site.</li> <li>• Keeps a copy of the EMP and ECC available at the borrow pit.</li> <li>• Conducts daily environmental monitoring, including: – Dust control – Waste handling – Stockpile management – Noise levels – Spill prevention.</li> <li>• Maintains compliance registers, daily site logs, and incident reports.</li> <li>• Coordinates clean-up actions after spills or non-compliance events.</li> <li>• Conducts toolbox talks on dust control, biodiversity protection, and safe working practices.</li> </ul>
	<ul style="list-style-type: none"> <li>• Conducts periodic independent site inspections to verify compliance.</li> <li>• Reviews weekly monitoring reports submitted by the EO.</li> </ul>

Role	Responsibilities (Adapted for Borrow Pit Operations)
<b>Environmental Control Officer (ECO)</b>	<ul style="list-style-type: none"> <li>• Provides guidance on rehabilitation methods and regulatory expectations.</li> <li>• Reviews corrective actions and advise on updates to the EMP where necessary.</li> </ul>
<b>Contractors and Subcontractors</b>	<ul style="list-style-type: none"> <li>• Comply with all provisions of the EMP and environmental legislation.</li> <li>• Attend environmental awareness and safety training sessions.</li> <li>• Report incidents such as spills, wildlife encounters, or equipment leaks.</li> <li>• Implement best practices for waste management, dust suppression, and safe vehicle operation.</li> </ul>

## 9. Environmental Training and Awareness

Environmental training and awareness are fundamental to ensuring that all personnel involved in borrow pit operations understand their responsibilities and apply environmentally responsible practices at all times. The purpose of the training programme is to ensure that every worker, contractor and subcontractor:

- Understands the environmental requirements of the borrow pit operations
- Complies with all applicable legislation and EMP provisions
- Contributes to pollution prevention and risk reduction
- Adopts best practices in biodiversity protection, waste management and safety
- Is prepared to respond appropriately in emergencies

### 9.1. Training and Induction Programme

All personnel accessing the site will receive a mandatory environmental induction prior to commencement of activities. The induction will be concise and focused on operational controls relevant to short duration borrow pit activities.

### 9.1.1. Training Frequency

Given the short-term and intermittent nature of operations:

- Environmental induction will be conducted once per mobilisation period and for all new personnel before site access
- Refresher training will only be provided if operations extend beyond three months or if there are changes in work activities or personnel
- Toolbox talks will be conducted on an as-needed basis, particularly at mobilisation, after incidents, or during high-risk activities

Attendance registers and brief induction records will be maintained by the Site Supervisor or Environmental Officer and made available for inspection if required.

## 10. Monitoring and Compliance

A structured monitoring programme will be implemented to ensure compliance with mitigation measures and to identify emerging impacts. Key monitoring components include:

- **Dust levels:** Daily visual inspection during operations and increased monitoring during high wind conditions
- **Off-track driving:** Daily site inspections and weekly photographic monitoring
- **Rehabilitation progress:** Weekly assessment of disturbed versus rehabilitated areas
- **Visual condition:** Fortnightly photo-point monitoring from agreed viewpoints
- **Complaints and stakeholder queries:** Continuous logging and response within 24 hours

Monitoring will be conducted by the Site Supervisor and Environmental Control Officer, with records maintained in a monitoring register. Findings will be reported weekly during operations and summarised in monthly environmental compliance reports.

## 10.1. Compliance Mechanisms

Table 3: Compliance Mechanisms

Monitoring Aspect	Description of Monitoring Activities	Frequency
<b>Air Quality and Dust Control</b>	Inspect dust levels from excavation, loading, stockpiles and haul roads. Confirm implementation of dust suppression, including watering and speed control.	Weekly, and daily during high winds
<b>Noise Monitoring</b>	Observe noise levels from machinery and haul trucks. Ensure compliance with acceptable limits, especially near tourism or recreational routes.	As needed, or when complaints arise
<b>Soil Stability and Erosion</b>	Inspect pit walls, access tracks and stockpile areas for erosion, collapse, or surface instability. Ensure slopes remain safe and stable.	Weekly
<b>Waste and Hazardous Substances</b>	Check waste bins, bunded areas, hydrocarbon storage and refuelling points. Ensure correct waste segregation and spill prevention measures.	Weekly
<b>Biodiversity and Wildlife Checks</b>	Inspect for vegetation damage beyond the demarcated footprint, wildlife presence, or any disturbance to sensitive features such as lichens. Confirm compliance with no-harm rules.	Monthly
<b>Health and Safety Compliance</b>	Verify that workers use PPE, obey traffic controls, and follow safe working procedures. Inspect signage, fire extinguishers and first aid kits.	Daily
<b>Rehabilitation Progress</b>	Evaluate reshaping of excavated areas, replacement of topsoil, and natural recovery in areas undergoing rehabilitation.	Annually and after site closure

## 10.2. Reporting & Documentation

To maintain transparency and regulatory compliance, all environmental monitoring activities must be documented and reported.

Table 4: Reporting requirements

Report Type	Contents	Submission Frequency
<b>Monthly Environmental Compliance Report (Internal)</b>	Records of dust control, waste logs, spill reports, erosion inspections, wildlife observations, and corrective actions taken.	Monthly
<b>Biannual EMP Compliance Report (MEFT Requirement)</b>	Summary of environmental monitoring results, non-compliance events, corrective actions, rehabilitation progress, and overall EMP compliance.	Twice per year (to MEFT)
<b>Incident and Emergency Reports</b>	Detailed account of any spill, fire, injury, equipment failure, or event resulting in significant dust or environmental harm.	Within 24 hours of the incident
<b>Rehabilitation Report</b>	Assessment of topsoil replacement, shaping, erosion control, and vegetation recovery on rehabilitated areas.	At final closure

## 11. Mitigation Measures

The following table provides an overview of all the major environmental management aspects.

Table 5: EMP Mitigation Measures

Project Phase	Project Activity	Impact	Management Details / Mitigation Measures	Responsible Persons	Frequency
Pre-Operation	Site selection and footprint demarcation	Land-use change	<ul style="list-style-type: none"> <li>Select already disturbed areas where possible.</li> <li>Confine footprint strictly to surveyed borrow pit area.</li> <li>Avoid drainage lines, lichen fields, and sensitive habitats.</li> </ul>	Project Manager (PM), Environmental Control Officer (ECO)	Once-off, verify weekly
	Site demarcation	Visual impact	<ul style="list-style-type: none"> <li>Clearly mark all boundaries.</li> <li>Cluster temporary facilities to reduce visual impact.</li> <li>Maintain clean, uncluttered workspace.</li> </ul>	ECO	Pre-operation and monthly
	Access via existing C28/D1984 tracks	Soil erosion	<ul style="list-style-type: none"> <li>Use existing tracks only.</li> <li>No new roads without approval.</li> <li>Monitor for erosion</li> <li>Re-shape and stabilise disturbed surfaces if erosion is observed</li> </ul>	Site Supervisor, ECO	Weekly

Project Phase	Project Activity	Impact	Management Details / Mitigation Measures	Responsible Persons	Frequency
	Access routes in desert environment	Habitat disturbance	<ul style="list-style-type: none"> <li>Conduct a walk-through to identify sensitive flora/fauna.</li> <li>Enforce 30 km/h speed limit to minimise wildlife collisions.</li> <li>Avoid any off-track driving.</li> </ul>	ECO, Site Supervisor	Pre-operation + weekly
	Use of existing park tracks (if applicable)	Impact on park infrastructure	<ul style="list-style-type: none"> <li>Obtain required access permits.</li> <li>Limit vehicle movement to designated routes.</li> <li>Repair damage caused by vehicles.</li> </ul>	Site Supervisor, ECO	Ongoing
<b>Operation</b>	Excavation (max 1.5 m depth)	Soil disturbance	<ul style="list-style-type: none"> <li>Excavate only within demarcated pit.</li> <li>Stockpile topsoil separately for later rehabilitation.</li> <li>Maintain stable side slopes.</li> </ul>	Site Supervisor, ECO	Daily
	Excavation and loading	Dust generation	<ul style="list-style-type: none"> <li>Limit vehicle speed to 25–30 km/h.</li> <li>Halt operations during extreme winds.</li> </ul>	Site Supervisor, ECO	Daily
	Hauling of material	Noise and emissions	<ul style="list-style-type: none"> <li>Maintain machinery to reduce fumes/noise.</li> <li>Operations restricted to daylight hours only</li> <li>No night-time activity</li> <li>Inform stakeholders if temporary noise increases.</li> </ul>	Site Supervisor	Weekly

Project Phase	Project Activity	Impact	Management Details / Mitigation Measures	Responsible Persons	Frequency
	Stockpiling sub-base material	Erosion and dust	<ul style="list-style-type: none"> <li>• Locate stockpiles away from drainage lines.</li> <li>• Keep piles compact and stabilised.</li> </ul>	ECO	Weekly
	Machinery use and refuelling	Hydrocarbon spills	<ul style="list-style-type: none"> <li>• No on-site fuel storage permitted</li> <li>• Refuelling and servicing to occur off-site</li> <li>• Spill kits carried in vehicles</li> <li>• Immediate clean-up and removal of contaminated soil if leaks occur</li> <li>•</li> </ul>	HSE Officer, ECO	Daily
	Vehicle movement	Wildlife disturbance	<ul style="list-style-type: none"> <li>• Enforce speed limits.</li> <li>• No off-route driving.</li> <li>• Report wildlife encounters to ECO.</li> </ul>	Site Supervisor, ECO	Daily
	General operations	Waste mismanagement	<ul style="list-style-type: none"> <li>• Provide labelled waste bins.</li> <li>• No burning or burying of waste.</li> <li>• Dispose waste at approved municipal sites.</li> </ul>	Site Supervisor, ECO	Weekly
	Heavy truck movement	Safety hazards	<ul style="list-style-type: none"> <li>• Install warning signs.</li> <li>• Require headlights during travel.</li> <li>• Provide PPE to workers near trucks.</li> </ul>	Site Supervisor, ECO	Daily
	Material stockpiling, equipment positioning and	Visual sensitivity	<ul style="list-style-type: none"> <li>• Maintain low-profile stockpiles and avoid steep or elevated pile formation</li> </ul>	Site Supervisor, ECO	Daily during active operations

Project Phase	Project Activity	Impact	Management Details / Mitigation Measures	Responsible Persons	Frequency
	daily site operations		<ul style="list-style-type: none"> <li>Park machinery in visually unobtrusive locations within the demarcated footprint</li> <li>Avoid placing equipment, stockpiles or temporary facilities on ridgelines or skyline positions</li> <li>Limit the spatial extent of active working areas at any one time to reduce visual disturbance</li> </ul>		
	Progressive rehabilitation of worked areas	Extended surface disturbance	<ul style="list-style-type: none"> <li>Re-shape and stabilise scraped areas as extraction advances</li> <li>Avoid leaving open disturbed areas</li> </ul>	Site Supervisor, ECO	Ongoing during operations
<b>Rehabilitation &amp; Closure</b>	Backfilling / shaping	Soil restoration	<ul style="list-style-type: none"> <li>Shape pit edges to blend with natural contours.</li> <li>Replace stored topsoil.</li> <li>Avoid over-compaction.</li> </ul>	Site Supervisor, ECO	At closure
	Final site clean-up	Visual impact	<ul style="list-style-type: none"> <li>Remove all waste and temporary structures.</li> <li>Restore site to natural appearance.</li> </ul>	ECO	Once-off
	Erosion stabilisation	Long-term erosion	<ul style="list-style-type: none"> <li>Install brush cover or berms where needed.</li> <li>Monitor for gullyng.</li> </ul>	ECO	Quarterly after closure
	Biodiversity recovery	Vegetation regeneration	<ul style="list-style-type: none"> <li>Restrict access to rehabilitated areas.</li> <li>Visual confirmation of surface recovery prior to final demobilisation</li> </ul>	ECO	Annual

Project Phase	Project Activity	Impact	Management Details / Mitigation Measures	Responsible Persons	Frequency
	Closure impacts	Local employment loss	<ul style="list-style-type: none"> <li>Provide notice of project completion.</li> <li>Explore temporary skills development during operations.</li> </ul>	ECO, HSE Officer	At closure
<b>Waste Management (All Phases)</b>	Waste disposal	Long-term contamination	<ul style="list-style-type: none"> <li>Maintain waste register.</li> <li>Remove all waste to licensed disposal sites.</li> <li>Never bury or burn waste.</li> </ul>	ECO, HSE Officer	Weekly
<b>All Phases</b>	Hazardous material handling	Soil/water contamination	<ul style="list-style-type: none"> <li>Store hazardous waste in sealed, labelled, banded areas.</li> <li>Use licensed handlers for disposal.</li> <li>Train staff on spill response.</li> </ul>	ECO, HSE Officer	Weekly
	Heritage protection	Damage to archaeological sites	<ul style="list-style-type: none"> <li>Apply Chance Finds Procedure.</li> <li>Stop work immediately if artefacts found.</li> <li>Notify Heritage Council.</li> </ul>	ECO, Heritage Officer	As needed
	Neighbouring land users & tourism	Impact on livelihoods	<ul style="list-style-type: none"> <li>Maintain communication with nearby stakeholders.</li> <li>Control dust at boundary points.</li> <li>Avoid operations near recreational areas during peak use.</li> </ul>	Community Liaison Officer, ECO	Monthly

### 11.1. Cumulative Impacts

Cumulative impacts were assessed in the context of existing and approved sand and gravel extraction activities within the broader Swakopmund–Dorob area. While individual borrow pits are typically small and temporary, cumulative effects may arise through incremental landscape alteration, increased dust along shared access routes, and gradual visual fragmentation of the desert environment.

Although cumulative impacts cannot be mitigated by a single project in isolation, the mitigation measures outlined in Table 5 have been specifically designed to minimise the project’s contribution to cumulative pressures. These include strict confinement of activities to the approved footprint, exclusive use of existing access routes, control of dust emissions, avoidance of off-track driving, progressive rehabilitation, and clear communication with neighbouring land users and tourism stakeholders.

When implemented effectively, these measures ensure that the project’s incremental contribution to cumulative impacts remains low and reversible and does not compromise the broader conservation and tourism objectives of Dorob National Park.

## 12. Rehabilitation

Rehabilitation is a central requirement of the Environmental Management Plan for the proposed project. Because borrow pit operations involve shallow extraction and predictable disturbance, effective rehabilitation ensures that the site is left safe, stable, and capable of natural recovery. Rehabilitation must start early, continue throughout operations, and be finalised at closure to avoid long-term environmental degradation.

### 12.1. Rehabilitation Measures

#### 12.2. Pre-Operation

Before excavation begins:

- Select the pit footprint to minimise environmental impact by using areas of sparse vegetation and previously disturbed ground where available.
- Avoid sensitive areas such as drainage lines, quartz patches with specialised flora, and any observed lichen fields.
- Demarcate the excavation boundaries clearly to avoid unnecessary disturbance.

#### 12.3. During Borrow Pit Operation

During excavation and hauling:

- Stockpile topsoil separately around the pit for later use.
- Maintain top-soil piles at low heights to avoid wind erosion.
- Use the excavated material efficiently and avoid unnecessary over-excavation.
- Stabilise exposed areas where erosion risk is visible.
- Implement erosion control measures such as berms, contouring, or brush layering
- Apply dust suppression to reduce further disturbance to vegetation.
- Ensure effective waste control so that no scrap, plastics, or hazardous substances remain on-site.

## 12.4. Post-Operation (Closure Phase)

When excavation is complete:

- Backfill or level the working floor to safe, stable levels where required.
- Re-spread topsoil evenly across disturbed surfaces to promote natural revegetation.
- Shape the rehabilitated pit to blend with surrounding natural contours.
- Remove all temporary structures, waste, and debris.
- Stabilise soil with brush, stone packing, or natural barriers if wind erosion risk persists.
- Allow the area to recover naturally given the low and patchy vegetation typical of the central Namib.
- Conduct periodic monitoring to confirm successful recovery.

## 12.5. Progressive Rehabilitation Approach

The borrow pit design allows for progressive rehabilitation, meaning:

- Rehabilitate areas immediately after they are no longer needed.
- Reduce the extent of open, disturbed ground at any one time.
- Limit long-term erosion and visual impacts.
- Reduce final closure costs.
- Enable adaptive management if natural recovery is slower than expected.

## 12.6. Final Site Closure

Once rehabilitation is deemed successful:

- The site will be formally closed and returned to its pre-project function, which is natural desert open space.
- If any small areas require longer-term monitoring, this will be documented and managed.

- All access routes used solely for the borrow pit will be closed off and allowed to recover naturally unless otherwise agreed with authorities.

### **13. Conclusion**

This Environmental Management Plan provides a full framework for ensuring that the project is implemented responsibly, sustainably, and in compliance with environmental legislation. The EMP guides all project phases from preparation to operation and final rehabilitation, ensuring that environmental risks are minimised and managed effectively.

Key commitments include:

- Full compliance with the Environmental Management Act and conditions of the ECC
- Pollution prevention and responsible use of natural resources
- Clear procedures for dust control, biodiversity protection, waste handling, and hazardous material management
- Stakeholder communication to maintain trust, transparency, and accountability
- Regular environmental monitoring and reporting to ensure early detection of impacts
- Robust rehabilitation and site restoration to return the land to a stable and natural state

Successful implementation of the EMP depends on the coordinated efforts of the proponent, contractors, environmental officers, and regulators. The EMP remains a living document and may be updated as conditions change, or new information becomes available.

Through adherence to this EMP, the project can proceed with minimal environmental impact while contributing to local development and infrastructure needs.