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# Environmental Management Plan for the proposed construction and operation of a brick factory in Oshakati, Oshana Region

**EMP**

**Final**

**25 October 2022**

**Oshana Crusher Trading CC**

**GCS Project Number: 22-0163**

**MEFT Reference: APP-00177**



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**ACRONYMS AND ABBREVIATIONS**

|       |   |
|-------|---|
| CV    | Curriculum Vitae  |
| DEAF  | Department of Environmental Affairs and Forestry          |
| EA    | Environmental Assessment                                  |
| EAP   | Environmental Assessment Practitioner                     |
| ECC   | Environmental Clearance Certificate                       |
| EIA   | Environmental Impact Assessment                           |
| EMA   | Environmental Management Act No 7 of 2007                 |
| EMP   | Environmental Management Plan                             |
| GCS   | GCS Water and Environmental Engineering Namibia (Pty) Ltd |
| I&APs | Interested and Affected Parties                           |
| MEFT  | Ministry of Environment, Forestry and Tourism             |
| PR    | Proponent's Representative                                |

## 1 OVERVIEW

### 1.1 Project Background

Oshana Crusher Trading CC (The Proponent) proposes to construct and operate a brickmaking factory in Oshakati. The proposed factory is to be located within the northwestern townlands of Oshakati in proximity to the Omugongo Estate and C46 road. The locality of the proposed development is shown in **Figure 1-1** below.

Oshakati is a fast-growing town in the Oshana Region. Increased development activities result in increased construction activities. As such there is an ever-growing demand for bricks within the subject area. The proposed brick making factory will assist in making available different kinds of bricks for purchase for construction purposes to Oshakati Town and its surrounding areas.

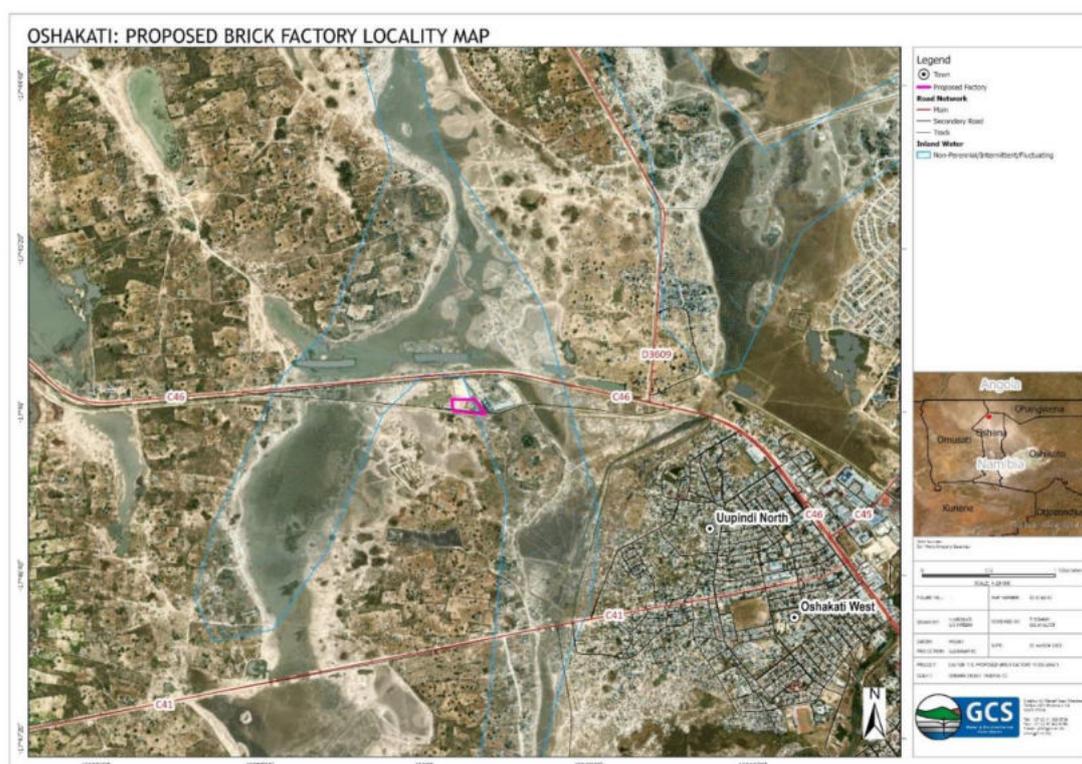


Figure 1-1: Locality map of proposed brick factory in Oshakati

### 1.2 Purpose of the EMP

Regulation 8 of the Environmental Management Act's (EMA) (7 of 2007) Environmental Impact Assessment Regulations (2012) requires that a Environmental Management Plan (EMP) be included as part of the scoping Environmental Assessment (EA) process. A 'management plan' is defined as:

*“...a plan that describes how activities that may have significant environments effects on the environment are to be mitigated, controlled and monitored.”*

An EMP is one of the most important outputs of the EA process as it synthesises all the proposed mitigation and monitoring actions, set to a timeline and with specific assigned responsibilities. It provides a link between the impacts identified in the Environmental Impact Assessment (EIA) Process and the required environmental management on the ground during project implementation and operation. It is important to note that an EMP is a legally binding document and a person who contravenes the provisions of this EMP may face imprisonment and/or a fine. This EMP is a living document and should be amended to adapt to project changes and/or environmental conditions and feedback from compliance monitoring.

The purpose of this document is therefore to guide environmental management throughout the following life-cycle stages of the proposed development construction, operation, and decommissioning.

The following phases are addressed in this EMP:

- **Planning and design (Pre-construction)** - the period, prior to the commencement of the construction phase, during which preliminary legislative and administrative arrangements are carried out in preparation of the proposed activities.
- **Construction** - the period during which construction of the proposed facility and associated infrastructure will be ongoing.
- **Operation** - the period during which the proposed brick factory and associated infrastructure will be operational.
- **Decommissioning** - Should the development be closed; this phase will be implemented.

### 1.3 Environmental Assessment Practitioner (EAP)

GCS Water Environmental Engineering Namibia (Pty) Ltd (“GCS” hereafter) has been appointed by the proponent as independent environmental consultants to conduct the required Environmental Assessment (EA) which includes compiling an EMP for the proposed development. The EMP is to be submitted with the scoping EA report as supporting documents to the application for an Environmental Clearance Certificate (ECC) to the Environmental Commissioner at the Department of Environmental Affairs and Forestry (DEAF) of the Ministry of Environment, Forestry and Tourism (MEFT). The EMP will also be used by Contractors as well as the Proponent in guiding them during the proposed operations to ensure that impacts on the environment are limited or avoided altogether.

## 1.4 Legal Requirements

The contents of the EMP must meet the requirements Section 8 (j) of the EIA Regulations which states that the EMP must include the following:

(aa) information on any proposed management, mitigation, protection or remedial measures to be undertaken to address the effects on the environment that have been identified including objectives in respect of rehabilitation of the environment and closure;

(bb) as far as is reasonably practicable, measures to rehabilitate the environment affected by the undertaking of the activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development; and

(cc) a description of the manner in which the applicant intends to modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation remedy the cause of pollution or degradation and migration of pollutants.

The EMP must address the potential environmental impacts of the proposed activity on the environment throughout the project life cycle. It must also include a system for assessment of the effectiveness of monitoring and management arrangements after implementation. The proponent therefore has the responsibility to ensure that the proposed activity, as well as the EIA process, conforms to the principles of the EMA and must ensure that any contractors appointed by them also comply with such principles.

Table 1-1 below lists the requirements of an EMP as stipulated by Section 8 (j) of the EIA Regulations.

**Table 1-1: Applicable and relevant Namibian legislations and guidelines for the EA process**

| Legislation   | Permit/Approval/Requirement   | Contact Details  |
|---|---|--|
| Environmental Management Act 2007<br>Environmental Impact Assessment (EIA) Regulations (EIAR) (GG No. 4878) | Amendments (required every 3 years) to this EMP will require an amendment of the ECC for these developments.<br>Activities listed in Government Notice (GN) No. 29 of GG No. 4878 require an ECC. | Mr Damian Nchindo<br>Department of Environmental Affairs, Ministry of Environment, Forestry and Tourism<br>Tel: 061 284 2701 |

| Legislation                                  | Permit/Approval/Requirement   | Contact Details   |
|--|---|---|
| Water Act 54 of 1956                         | <p>Prohibits the pollution of underground and surface water bodies (S23 (1)).</p> <p>Liability of clean-up costs after closure/abandonment of an activity (S23 (2)).</p>  | <p>Mr Witbooi (Department of Water Affairs):</p> <p>Tel: (061) 208 7226</p> |
| Water Resources Management Act No.11 of 2013 | <p>The act provides for the management, protection, development, use and conservation of water resources; and provides for the regulation and monitoring of water services and to provide for incidental matters. The objects of this Act are to:</p> <p>Ensure that the water resources of Namibia are managed, developed, used, conserved and protected in a manner consistent with, or conducive to, the fundamental principles set out in Section 66 - protection of aquifers, Subsection 1 (d) (iii) provide for preventing the contamination of the aquifer and water pollution control (Section 68).</p> |   |

| Legislation  | Permit/Approval/Requirement   | Contact Details  |
|--|---|--|
| Namibia Urban and Regional Planning Act No 5 of 2018 | To consolidate the laws relating to urban and regional planning; to provide for a legal framework for spatial planning in Namibia; to provide for principles and standards of spatial planning; to establish the urban and regional planning board; to decentralise certain matters relating to spatial planning; to provide for the preparation, approval and review of the national spatial development framework, regional structure plans and urban structure plans; to provide for the preparation, approval, review and amendment of zoning schemes; to provide for the establishment of townships; to provide for the alteration of boundaries of approved townships, to provide for the disestablishment of approved townships; to provide for the change of name of approved townships; to provide for the subdivision and consolidation of land; to provide for the alteration, suspension and deletion of conditions relating to land; and to provide for incidental matters | Mr Tobias Newaya<br><br>Ministry of Urban and Rural Development<br><br>tnewaya@murd.gov.na                             |
| Roads Ordinance 17 of 1972                           | <ul style="list-style-type: none"> <li>• Section 3.1 deals with width of proclaimed roads and road reserve boundaries</li> <li>• Section 27.1 is concerned with the control of traffic on urban trunk and main roads</li> <li>• Section 36.1 regulates rails, tracks, bridges, wires, cables, subways or culverts across or under proclaimed roads</li> <li>• Section 37.1 deals with Infringements and obstructions on and interference with proclaimed roads.</li> </ul>  | Ms Elina Lumbu<br><br>Roads Authority<br><br>Specialised road Legislation, Advise & Compliance<br><br>lumbue@ra.org.na |

| Legislation   | Permit/Approval/Requirement   | Contact Details   |
|---|---|---|
| Atmospheric Pollution Prevention Ordinance (No. 11 of 1976) | Part II - control of noxious or offensive gases,<br>Part III - atmospheric pollution by smoke,<br>Part IV - dust control, and<br>Part V - air pollution by fumes emitted by vehicles. | The development should consider the provisions outlined in the act. The proponent should apply for an Air Emissions permit from the Ministry of Health and Social Services (if needed). |

### 1.5 Assumptions and Limitations

This EMP has been drafted with the acknowledgment of the following assumptions and limitations:

- This EMP has been drafted based on the scoping-level EIA for the proposed development. No additional specialist studies were included as part of the assessment as no detailed assessment will be undertaken; and
- The mitigation measures recommended in this EMP document are based on the risks/impacts in the scoping report, which were identified based on the provided project description and site investigation. Should the scope of the project change, the risks will have to be reassessed and mitigation measures provided accordingly.

### 1.6 Report Structure

This EMP lays out the management actions for the proposed activities. The EMP addresses the following phases:

- **Planning and design (Pre-construction)** - the period, prior to the commencement of the construction phase, during which preliminary legislative and administrative arrangements are carried out in preparation of the proposed activities;
- **Construction** - the period during which construction of the proposed facility and associated infrastructure will be ongoing;
- **Operation** - the period during which the proposed brick factory and associated infrastructure will be operational;
- **Decommissioning** - Should the development be closed; this phase will be implemented.

## 2 ROLES AND RESPONSIBILITIES

The Proponent is ultimately responsible for the implementation of the EMP. The Proponent may delegate this responsibility at any time, as they deem necessary, from planning and design to operation and maintenance phase and decommissioning phase (if considered). The delegated responsibility for the effective implementation of this EMP will rest on the following key individuals, which may be fulfilled by the same person:

- Proponent's Representative
- Environmental Control Officer

### 2.1 Proponent's Representative

If the Proponent does not personally manage all aspects of the construction and operation and maintenance phase activities and decommissioning, as referred to in this EMP, they should assign this responsibility to a suitably qualified individual referred to in this plan as the Proponent's Representative (PR). The Proponent may decide to assign the role of a PR to one person for both phases. Alternatively, the Proponent may decide to assign a separate PR for each component i.e. construction, operation and maintenance and decommissioning phase. The PR's responsibilities are included in Table 2-1 below.

**Table 2-1: Responsibilities assigned to the Proponent's Representative for construction, operation and maintenance and decommissioning phases**

| Responsibility   | Project Phase                          |
|--|--|
| Managing the implementation of this EMP and updating and maintaining it when necessary                 | Throughout the lifetime of the project |
| Management and monitoring of individuals and/or equipment on-site in terms of compliance with this EMP | Throughout the lifetime of the project |
| Issuing fines for contravening EMP provisions  | Throughout the lifetime of the project |

### 2.2 Environmental Control Officer

The Proponent should assign the responsibility of overseeing the implementation of the whole EMP on the ground from the construction to operation and maintenance phase to a designated person, referred to in this EMP as the Environmental Control Officer (ECO). The Proponent may decide to assign this role to one person for both phases, or may assign separate individual ECOs to oversee EMP implementation during each phase. The ECOs will have the following responsibilities:

- Management and facilitation of communication between the Proponent, PR and Interested and Affected Parties (I&APs) with regard to this EMP;
- Conducting site inspections (recommended minimum frequency is monthly during construction and bi-annually during operation) of all areas with respect to the implementation of this EMP;
- Monitor and audit the implementation of the EMP and report bi-annually to MEFT:DEAF regarding compliance to the EMP;
- Advising the PR on the removal of person(s) and/or equipment not complying with the provisions of this EMP;
- Making recommendations to the PR with respect to the issuing of fines for contraventions of the EMP; and
- Undertaking an annual review of the EMP and recommending additions and/or changes to this document.

### 3 ENVIRONMENTAL MANAGEMENT PLAN ACTIONS

#### 3.1 Key Potential environmental impacts to be managed

From the EA, the following key potential impacts have been identified per project phase and are summarised in Table 3-1 below. The full impact description is presented in the tables under subchapter 3.2 to 3.5 as well as in the Scoping Report.

**Table 3-1: Summary of key potential environmental impacts per project phase**

|   | Project Phase    | Potential impacts identified in the EA   |
|---|------------------|--|
| 1 | Pre-construction | Biodiversity and traffic.  |
| 1 | Construction     | Biodiversity, soil, surface and groundwater contamination, soil erosion, health and safety, archaeological and heritage resources, dust, noise, waste, traffic and social impacts. |
| 2 | Operation        | Traffic, noise, dust, waste, health and safety, air quality, traffic and social impacts.   |
| 3 | Decommissioning  | Local people, Surrounding property owners, health and safety, dust, noise, soil, surface and groundwater contamination, soil erosion, traffic, social and waste.                   |

The aim of the management actions of the EMP is to avoid potential impacts where possible. Where impacts cannot be avoided, measures are provided to reduce the significance of these impacts.

Management actions recommended to manage the potential impacts rated in the EA carried out for the proposed development are presented in the following tables. The management actions were compiled based on the three project phases:

- Planning and design phase (pre-construction) (Table 3-2);
- Construction (Table 3-3);
- Operation and maintenance phase management actions (Table 3-4);
- Decommissioning (Table 3-5).

The responsible persons at Oshana Crusher Trading CC should assess these commitments in detail and should acknowledge their commitment to the specific management actions detailed in the table of the next subchapters.

### 3.2 Phase 1: Planning and Design Management Actions

The management requirements detailed in Table 3-2 need to be carried out before any activities commence on site while necessary preliminary legislative and administrative arrangements are made in preparation for the proposed activities on site.

**Table 3-2: Planning and design management actions**

| Aspect             | Management Requirement   |
|--------------------|--|
| EMP Implementation | <ul style="list-style-type: none"> <li>• The proponent should appoint a Proponent's Representative (PR) that will act as their on-site implementing agent.</li> <li>• This person should be responsible to ensure that the Proponent's responsibilities are executed in compliance with relevant legislation and this EMP.</li> </ul>  |
| Biodiversity       | <ul style="list-style-type: none"> <li>• Vegetation should be cleared only where absolutely necessary and if cleared, numbers of protected, endemic and near endemic species removed should be documented.</li> <li>• Trees and plants protected under the Forest Act No 12 of 2001 are not to be removed without a valid permit from the local Department of Forestry.</li> </ul> |
| Borrow Pits        | <ul style="list-style-type: none"> <li>• Sand/Stone should be sourced from a borrow pit with a valid ECC.</li> </ul>   |
| Air quality        | <ul style="list-style-type: none"> <li>• An air quality impact assessment is to be conducted prior to the operation of the plant in order to determine the potential impact to ambient air quality associated with the proposed facility.</li> </ul>   |

### 3.3 Phase 1: Construction Phase Management Actions

The management actions for the construction phase during which the construction activities will take place are listed in **Table 3-3**.

**Table 3-3: Construction phase management actions**

| Environmental Feature | Impact   | Management Actions  |
|-----------------------|--|---|
| EMP Implementation    | Lack of EMP awareness and the implications thereof | <ul style="list-style-type: none"> <li>The proponent should appoint a Proponent's Representative (PR) that will act as their on-site implementing agent.</li> <li>This person should be responsible to ensure that the Proponent's responsibilities are executed in compliance with relevant legislation and this EMP.</li> </ul>   |
| EMP training          | Lack of EMP awareness and the implications thereof | <ul style="list-style-type: none"> <li>Employees appointed for construction work must ensure that all personnel are aware of necessary health, safety, and environmental considerations applicable to their respective work.</li> </ul>   |
| Monitoring            | EMP non-compliance                                 | <ul style="list-style-type: none"> <li>The ECO or the Proponent/PR should monitor the implementation of this EMP.</li> <li>The PR should inspect the site throughout the construction phase at least on a monthly basis.</li> <li>Bi-annual audits should be conducted of site activities by an external ECO.</li> <li>Bi-annual audit reports are to be submitted to MEFT: DEAF for auditing.</li> </ul>   |
| Waste Management      | Visual impact and soil contamination               | <ul style="list-style-type: none"> <li>The construction site should always be kept tidy.</li> <li>All domestic and general waste produced daily should be cleaned and contained daily.</li> <li>No waste may be buried or burned.</li> <li>Waste containers (bins) should be emptied regularly and removed from site to the nearest municipal waste disposal site.</li> <li>All recyclable waste needs to be taken to the nearest recycling depot.</li> <li>A sufficient number of separate waste containers (bins) for hazardous and domestic / general waste must be provided on site.</li> <li>Construction workers should be sensitised to dispose of waste in a responsible manner and not to litter.</li> <li>No waste may remain on site after the completion of the project.</li> </ul> |

| Environmental Feature | Impact                             | Management Actions  |
|-----------------------|------------------------------------|---|
| Hazardous Waste       | Soil and groundwater contamination | <ul style="list-style-type: none"> <li>• All heavy construction vehicles and equipment on site should be provided with a drip tray.</li> <li>• All heavy construction vehicles should be maintained regularly to prevent oil leakages.</li> <li>• Maintenance and washing of construction vehicles should take place only at a designated workshop area which surface is impermeable.</li> <li>• Spill kits should be available at the workshop areas in case of spills.</li> </ul>   |
| Wastewater            | Groundwater contamination          | <ul style="list-style-type: none"> <li>• Use of the toilets instead of the veld must be strictly adhered to.</li> <li>• If grey water can be collected from ablution facilities at the contractors' camp it should be recycled and: <ul style="list-style-type: none"> <li>○ Used for dust suppression;</li> <li>○ Used to water vegetable gardens or to support a small nursery in local communities (as and when agreed upon by such communities); and/or</li> <li>○ Used to clean equipment.</li> </ul> </li> <li>• All run off materials such as wastewater and other potential contaminants should be contained on site and disposed of in accordance with municipal wastewater discharge standards, so that they do not reach to ground or surface water systems.</li> <li>• Wastewater (excluding sewage) should be drained into lined / impermeable catch pits, big enough for daily / weekly usage without overflowing. Water from these catch pits should be removed from site to the nearest wastewater treatment facility by an approved wastewater removal company.</li> </ul> |
| Soil                  | Soil contamination                 | <ul style="list-style-type: none"> <li>• Spill control preventative measures should be put in place to manage soil contamination.</li> <li>• An impermeable liner should be laid down (particularly beneath cement mixers) on the site area in order to prevent contaminants from reaching to surrounding soils and eventually groundwater systems.</li> </ul>  |

| Environmental Feature | Impact   | Management Actions  |
|-----------------------|--|---|
|                       |  | <ul style="list-style-type: none"> <li>• Potential contaminants such wastewater should be contained on site and disposed of in accordance with municipal wastewater discharge standards so that they do not contaminate surrounding soils.</li> <li>• Contaminants such as hydrocarbons should be stored, handled, and managed appropriately. These must be collected on site and disposed at an appropriate facility that is licenced to receive such waste.</li> <li>• Soil contamination should be monitored on site daily by PR and monthly by ECO.</li> <li>• ECO(s) should ensure that a sufficient number of drip trays are available on-site and that these are utilised in the event of leakage from construction trucks or vehicles.</li> <li>• Contaminated soils onsite that may have resulted from leakage/spillage construction vehicles or equipment should be removed to a depth dependent on the size of the spill and replaced with clean soil. The contaminated soil should be removed and disposed at a designated landfill site suitable to receive contaminated soil.</li> <li>• Visual soil assessment for signs of contamination at vehicle holding, parking and activity areas.</li> <li>• Place oil drip trays under parked construction vehicles and hydraulic equipment at the site.</li> </ul> |
| Soil                  | Soil interflow processes<br><br>Soil structure and land capability<br><br>Soil quality | <ul style="list-style-type: none"> <li>• Only excavate areas applicable to the project area.</li> <li>• Backfill the material in the same order it was excavated to reduce contamination of deeper soils with shallow oxidised soils.</li> <li>• Cover excavated soils with a temporary liner to prevent contamination.</li> <li>• Keep the site clean of all general and domestic wastes.</li> <li>• All development footprint areas to remain as small as possible and vegetation clearing to be limited to what is essential.</li> <li>• Exposed soils to be protected using a suitable covering or revegetating.</li> </ul>   |

| Environmental Feature | Impact                    | Management Actions   |
|-----------------------|---------------------------|--|
|                       |                           | <ul style="list-style-type: none"> <li>• Existing roads should be used as far as practical to gain access to the site.</li> <li>• Have emergency fuel &amp; oil spill kits on site.</li> </ul>   |
| Dust and noise        | Nuisance impacts          | <ul style="list-style-type: none"> <li>• The contractor(s) should suppress dust associated with construction activities by using a reasonable amount of water.</li> <li>• If feasible, wastewater should be treated to an acceptable water quality level, so that it can be used for dust suppression, if needed.</li> <li>• Noise levels during construction activities should be kept within the allowable standards for urban areas.</li> <li>• Noise levels should adhere to the SANS restrictions on noise.</li> <li>• Work hours should be restricted to between 08h00 and 17h00 due to the use of heavy equipment, power tools and the movement of heavy vehicles.</li> <li>• Noisy equipment should be shut down when not in use (when not needed) to avoid unnecessary noise on site.</li> <li>• Workers performing noisy tasks should be rotated regularly (work on shifts) to avoid exposing them to excessive noise for a long period of time in a day.</li> <li>• Workers should be equipped with personal protective equipment (PPE) such as earplugs to reduce noise exposure.</li> <li>• Workers should ensure that they wear the necessary PPE at all times on work sites.</li> </ul> |
| Health and Safety     | Health and safety impacts | <ul style="list-style-type: none"> <li>• The contractor(s) should ensure that all personnel are provided with personal protective equipment (PPE), such as coveralls, gloves, safety boots, safety glasses and hard hats at all times.</li> <li>• Workers should ensure that they wear the PPE at all times on work sites.</li> <li>• No workers should be allowed to drink alcohol during working hours.</li> <li>• No workers should be allowed on site if under the influence of alcohol.</li> </ul>  |

| Environmental Feature  | Impact                    | Management Actions   |
|------------------------|---------------------------|--|
|                        |                           | <ul style="list-style-type: none"> <li>• An appropriate location should be indicated on the site for the parking of construction and operation vehicles.</li> <li>• No unauthorised access should be allowed to the construction sites.</li> </ul>   |
| Construction labourers | Recruitment               | <ul style="list-style-type: none"> <li>• The Proponent should ensure that locals from the surrounding areas are employed for any unskilled labour.</li> <li>• Construction labourers should not be recruited on-site.</li> </ul>   |
| Construction labourers | General health and safety | <ul style="list-style-type: none"> <li>• A suitable number of portable toilets (i.e., easily transportable) should be available on site.</li> <li>• Separate ablutions should be available for men and women and should clearly be indicated as such.</li> <li>• Sewage waste needs to be removed on a regular basis to the nearest approved sewage disposal site.</li> <li>• Workers responsible for cleaning the toilets should be provided with latex gloves and masks.</li> <li>• No workers may reside on-site for the entire duration of the construction period. Only a security guard will be allowed to sleep on-site (if there will be any).</li> </ul>  |
| Communication          | Communication with I&APs  | <ul style="list-style-type: none"> <li>• The Proponent or contractor should draft a Communication Plan, which should outline as a minimum the following: <ul style="list-style-type: none"> <li>○ How stakeholders, who require ongoing communication for the duration of the construction period, will be identified and recorded and who will manage and update these records.</li> <li>○ How these stakeholders will be consulted on an ongoing basis.</li> <li>○ Provision should be made for a grievance mechanism - outlining how concerns will be lodged/recorded and how feedback will be delivered, inclusive of further steps of arbitration in the event that feedback is deemed unsatisfactory.</li> </ul> </li> </ul> |

| Environmental Feature | Impact                     | Management Actions  |
|-----------------------|----------------------------|---|
|                       |                            | <ul style="list-style-type: none"> <li>○ Stakeholders need to be informed of the communication plan once drafted to ensure they are aware of the relevant communication channels.</li> </ul>  |
| Water                 | Groundwater contamination  | <ul style="list-style-type: none"> <li>• No wastewater / effluent should be allowed to leave the site premises without proper control.</li> <li>• These should be disposed of in accordance with municipal wastewater discharge standards.</li> <li>• Regular maintenance and monitoring of construction equipment and vehicles should be done to detect early spills or leakages.</li> <li>• An emergency plan should be available for major / minor spills at the construction site during operation activities (with consideration of air, groundwater, soil, and surface water).</li> <li>• Groundwater impact awareness training should be provided to the employees involved in this phase.</li> </ul>  |
| Archaeology           | Loss of heritage resources | <ul style="list-style-type: none"> <li>• Should a heritage site or archaeological site be uncovered or discovered during the construction phase of the project, a “chance find” procedure should be applied in the order they appear below: <ul style="list-style-type: none"> <li>○ If operating machinery or equipment, stop work;</li> <li>○ Demarcate the site with danger tape;</li> <li>○ Determine GPS position if possible;</li> <li>○ Report findings to the construction foreman;</li> <li>○ Report findings, site location and actions taken to superintendent;</li> <li>○ Cease any works in immediate vicinity;</li> <li>○ Visit site and determine whether work can proceed without damage to findings;</li> <li>○ Determine and demarcate exclusion boundary;</li> <li>○ Site location and details to be added to the project’s Geographic Information System (GIS) for field confirmation by archaeologist;</li> <li>○ Inspect site and confirm addition to project GIS;</li> </ul> </li> </ul> |

| Environmental Feature | Impact           | Management Actions   |
|-----------------------|------------------|--|
|                       |                  | <ul style="list-style-type: none"> <li>○ Advise the National Heritage Council of Namibia (NHCN) and request written permission to remove findings from work area; and</li> <li>○ Recovery, packaging and labelling of findings for transfer to National Museum.</li> <li>• Should human remains be found, the following actions will be required: <ul style="list-style-type: none"> <li>○ Apply the chance find procedure as described above;</li> <li>○ Schedule a field inspection with an archaeologist to confirm that remains are human;</li> <li>○ Advise and liaise with the NHCN and Police; and</li> <li>○ Remains will be recovered and removed either to the National Museum or the National Forensic Laboratory.</li> </ul> </li> </ul> |
| Noise                 | Nuisance impacts | <ul style="list-style-type: none"> <li>• Work hours should be restricted to between 08h00 and 17h00 where construction involving the use of heavy equipment, power tools and the movement of heavy vehicles is less than 500 m from residential areas. If an exception to this provision is required, all residents within the 500 m radius should be given 1 week's written notice.</li> </ul>  |
| Rehabilitation        | Visual impact    | <ul style="list-style-type: none"> <li>• Upon completion of the construction phase consultations should be held with the local community/property owner(s) regarding the post-construction use of remaining excavated areas (if applicable).</li> <li>• In the event that no post-construction uses are requested, all excavated/degraded areas need to be rehabilitated as follows: <ul style="list-style-type: none"> <li>○ Excavated areas may only be backfilled with clean or inert fill. No material of hazardous nature (e.g. sand removed with an oil spill) may be dumped as backfill.</li> <li>○ Rehabilitated excavated areas need to match the contours of the existing landscape.</li> </ul> </li> </ul>                                |

| Environmental Feature | Impact   | Management Actions  |
|-----------------------|--|---|
|                       |  | <ul style="list-style-type: none"> <li>○ The rehabilitated area should not be higher (or lower) than nearby drainage channels. This ensures the efficiency of revegetation and reduces the chances of potential erosion.</li> <li>○ Topsoil is to be spread across excavated areas evenly.</li> <li>○ Deep ripping of areas to be rehabilitated is required, not just simple scarification, so as to enable rip lines to hold water after heavy rainfall.</li> <li>● Ripping should be done along slopes, not up and down a slope, which could lead to enhanced erosion.</li> </ul> |
| Topsoil               | Loss of topsoil and associated opportunity costs | <ul style="list-style-type: none"> <li>● When excavations are carried out, topsoil<sup>1</sup> should be stockpiled in a demarcated area.</li> <li>● Stockpiled topsoil should be used to rehabilitate post-construction degraded areas and/or other nearby degraded areas if such an area is located a reasonable distance from the stockpile.</li> </ul>  |

<sup>1</sup> Topsoil is defined here as the top 150mm of surface material, which accounts for the seedbank.

### 3.4 Phase 2: Operational Phase Management Actions

The table below (Table 3-4) presents the management action for operational phase.

**Table 3-4: Operational phase management actions**

| Environmental Feature | Impact   | Management Actions  |
|-----------------------|--|---|
| EMP Training          | Lack of EMP awareness and the implications thereof | <ul style="list-style-type: none"> <li>All contractors appointed for maintenance work on the respective infrastructure must ensure that all personnel are aware of necessary health, safety, and environmental considerations applicable to their respective work.</li> </ul>   |
| Personnel             | Recruitment of qualified personnel                 | <ul style="list-style-type: none"> <li>Suitably qualified and/or skilled personnel should be appointed to run the factory as required based on the technology employed and the relevant expertise required to ensure efficient operation of the factory.</li> </ul>   |
| Water                 | Surface and groundwater contamination              | <ul style="list-style-type: none"> <li>Ensure that surface run-off water accumulating on-site are channelled and captured through a proper storm water management system to be treated in an appropriate manner before disposal into the environment.</li> </ul>  |
| Aesthetics            | Visual impacts                                     | <p>The proponent should consult with a view to incorporate the relevant local/national/international development guidelines which addresses the following:</p> <ul style="list-style-type: none"> <li>The incorporation of indigenous vegetation into the development.</li> <li>To mark the area with appropriate road warning signs (e.g., the road curves to the left/right)</li> </ul>   |
| Noise                 | Noise impact                                       | <ul style="list-style-type: none"> <li>The proponent should consult with the view to incorporate the relevant local /national/ international guidelines to manage the generation of traffic noise in the development area.</li> </ul>   |
| Dust                  | Dust generation                                    | <ul style="list-style-type: none"> <li>If dust levels become excessive dust abatement techniques should be implemented e.g., spraying of water.</li> <li>The use of water less dust suppression means (such as lignosulphonate products such as Dustex) should be considered during periods of water scarcity.</li> <li>Covers should be placed on trucks bringing in raw materials such as sand to ensure dust levels are kept minimal.</li> </ul> |

| Environmental Feature | Impact                    | Management Actions   |
|-----------------------|---------------------------|--|
|                       |                           | <ul style="list-style-type: none"> <li>Fitting the silo with dust-restraining bag filters.</li> </ul>  |
| Traffic               | Traffic impact            | <ul style="list-style-type: none"> <li>Vehicles are to make use of the approved access point.</li> <li>Vehicles to make use of existing access roads no off-road driving should be permitted.</li> <li>Obey speed restrictions and traffic rules.</li> </ul>   |
| Waste                 | Pollution                 | <ul style="list-style-type: none"> <li>The site should be kept tidy at all times.</li> <li>All domestic and general construction waste produced on a daily basis should be cleared and contained.</li> <li>No waste may be buried or burned on site or anywhere else.</li> <li>Waste containers (bins) should be emptied weekly and the waste removed from site to the municipal waste disposal site.</li> <li>Separate waste containers (bins) for hazardous and domestic / general waste must be provided on site.</li> <li>Workers at the site should be sensitised to dispose of waste in a responsible manner and not to litter.</li> <li>No waste may remain on site after the completion of the project.</li> <li>The recycling of waste should be considered and implemented as far as possible</li> </ul> |
| Health and Safety     | General health and safety | <ul style="list-style-type: none"> <li>Workers should be provided with awareness training about the risks associated with the proposed work such as hydrocarbon handling and storage, the handling of heavy machinery etc.</li> <li>During the works conducted, workers should be properly equipped with personal protective equipment (PPE) such as coveralls, gloves, safety boots, safety glasses etc.</li> <li>The operations should comply with the provisions with regards to health and safety as outlined in the Labour Act (No. 6 of 1992).</li> </ul>  |

### 3.5 Decommissioning Phase

The table below (Table 3-5) presents the management action for decommissioning phase.

**Table 3-5: Decommissioning Phase Management Actions**

| Environmental Feature | Impact   | Management Actions  |
|-----------------------|--|---|
| EMP training          | Lack of EMP awareness and the implications thereof | <ul style="list-style-type: none"> <li>Employees appointed for decommissioning work must ensure that all personnel are aware of necessary health, safety, and environmental considerations applicable to their respective work.</li> </ul>  |
| Waste Management      | Visual impact and soil contamination               | <ul style="list-style-type: none"> <li>The site should always be kept tidy.</li> <li>All domestic and general waste produced daily should be cleaned and contained daily.</li> <li>No waste may be buried or burned.</li> <li>Waste containers (bins) should be emptied regularly and removed from site to the nearest municipal waste disposal site.</li> <li>All recyclable waste needs to be taken to the nearest recycling depot.</li> <li>A sufficient number of separate waste containers (bins) for hazardous and domestic / general waste must be provided on site.</li> <li>Workers should be sensitised to dispose of waste in a responsible manner and not to litter.</li> <li>No waste may remain on site after the completion of the project.</li> </ul> |
| Hazardous Waste       | Soil and groundwater contamination                 | <ul style="list-style-type: none"> <li>All heavy vehicles and equipment on site should be provided with a drip tray.</li> <li>All heavy construction vehicles should be maintained regularly to prevent oil leakages.</li> <li>Maintenance and washing of vehicles should take place only at a designated workshop area which surface is impermeable.</li> <li>Spill kits should be available at the workshop areas in case of spills.</li> </ul>   |
| Wastewater            | Groundwater contamination                          | <ul style="list-style-type: none"> <li>Use of the toilets instead of the veld must be strictly adhered to.</li> <li>If grey water can be collected from ablution facilities at the contractors' camp it should be recycled and: <ul style="list-style-type: none"> <li>Used for dust suppression;</li> </ul> </li> </ul>  |

| Environmental Feature | Impact             | Management Actions   |
|-----------------------|--------------------|--|
|                       |                    | <ul style="list-style-type: none"> <li>○ Used to water vegetable gardens or to support a small nursery in local communities (as and when agreed upon by such communities); and/or</li> <li>○ Used to clean equipment.</li> <li>• All run off materials such as wastewater and other potential contaminants should be contained on site and disposed of in accordance with municipal wastewater discharge standards, so that they do not reach to ground or surface water systems.</li> <li>• Wastewater (excluding sewage) should be drained into lined / impermeable catch pits, big enough for daily / weekly usage without overflowing. Water from these catch pits should be removed from site to the nearest wastewater treatment facility by an approved wastewater removal company.</li> </ul>  |
| Soil                  | Soil contamination | <ul style="list-style-type: none"> <li>• Spill control preventative measures should be put in place to manage soil contamination.</li> <li>• Contaminants such as hydrocarbons should be stored, handled, and managed appropriately. These must be collected on site and disposed at an appropriate facility that is licenced to receive such waste.</li> <li>• Soil contamination should be monitored on site daily by PR and monthly by ECO.</li> <li>• ECO(s) should ensure that a sufficient number of drip trays are available on-site and that these are utilised in the event of leakage from construction trucks or vehicles.</li> <li>• Contaminated soils onsite that may have resulted from leakage/spillage construction vehicles or equipment should be removed to a depth dependent on the size of the spill and replaced with clean soil. The contaminated soil should be removed and disposed at a designated landfill site suitable to receive contaminated soil.</li> <li>• Visual soil assessment for signs of contamination at vehicle holding, parking and activity areas.</li> <li>• Place oil drip trays under parked construction vehicles and hydraulic equipment at the site.</li> </ul> |

| Environmental Feature | Impact   | Management Actions  |
|-----------------------|--|---|
| Soil                  | Soil interflow processes<br>Soil structure and land capability<br>Soil quality | <ul style="list-style-type: none"> <li>• Only excavate areas applicable to the project area.</li> <li>• Backfill the material in the same order it was excavated to reduce contamination of deeper soils with shallow oxidised soils.</li> <li>• Cover excavated soils with a temporary liner to prevent contamination.</li> <li>• Keep the site clean of all general and domestic wastes.</li> <li>• All development footprint areas to remain as small as possible and vegetation clearing to be limited to what is essential.</li> <li>• Exposed soils to be protected using a suitable covering or revegetating.</li> <li>• Existing roads should be used as far as practical to gain access to the site.</li> <li>• Have emergency fuel &amp; oil spill kits on site.</li> </ul>   |
| Dust and noise        | Nuisance impacts   | <ul style="list-style-type: none"> <li>• The contractor(s) should suppress dust associated with activities by using a reasonable amount of water.</li> <li>• Noise levels during decommissioning activities should be kept within the allowable standards for urban areas.</li> <li>• Noise levels should adhere to the SANS restrictions on noise.</li> <li>• Work hours should be restricted to between 08h00 and 17h00 due to the use of heavy equipment, power tools and the movement of heavy vehicles.</li> <li>• Noisy equipment should be shut down when not in use (when not needed) to avoid unnecessary noise on site.</li> <li>• Workers performing noisy tasks should be rotated regularly (work on shifts) to avoid exposing them to excessive noise for a long period of time in a day.</li> <li>• Workers should be equipped with personal protective equipment (PPE) such as earplugs to reduce noise exposure.</li> <li>• Workers should ensure that they wear the necessary PPE at all times on work sites.</li> </ul> |

| Environmental Feature  | Impact                    | Management Actions  |
|------------------------|---------------------------|---|
| Health and Safety      | Health and safety impacts | <ul style="list-style-type: none"> <li>• The contractor(s) should ensure that all personnel are provided with personal protective equipment (PPE), such as coveralls, gloves, safety boots, safety glasses and hard hats at all times.</li> <li>• Workers should ensure that they wear the PPE at all times on work sites.</li> <li>• No workers should be allowed to drink alcohol during working hours.</li> <li>• No workers should be allowed on site if under the influence of alcohol.</li> <li>• An appropriate location should be indicated on the site for the parking of construction and operation vehicles.</li> <li>• No unauthorised access should be allowed to the construction sites.</li> </ul> |
| Construction labourers | General health and safety | <ul style="list-style-type: none"> <li>• A suitable number of portable toilets (i.e., easily transportable) should be available on site.</li> <li>• Separate ablutions should be available for men and women and should clearly be indicated as such.</li> <li>• Sewage waste needs to be removed on a regular basis to the nearest approved sewage disposal site.</li> <li>• Workers responsible for cleaning the toilets should be provided with latex gloves and masks.</li> <li>• No workers may reside on-site for the entire duration of the construction period. Only a security guard will be allowed to sleep on-site (if there will be any).</li> </ul>   |
| Water                  | Groundwater contamination | <ul style="list-style-type: none"> <li>• No wastewater / effluent should be allowed to leave the site premises without proper control.</li> <li>• These should be disposed of in accordance with municipal wastewater discharge standards.</li> <li>• Regular maintenance and monitoring of construction equipment and vehicles should be done to detect early spills or leakages.</li> <li>• An emergency plan should be available for major / minor spills at the construction site during operation activities (with consideration of air, groundwater, soil, and surface water).</li> </ul>   |

| Environmental Feature | Impact                         | Management Actions   |
|-----------------------|--------------------------------|--|
| Noise                 | Nuisance impacts               | <ul style="list-style-type: none"> <li>• Work hours should be restricted to between 08h00 and 17h00 where construction involving the use of heavy equipment, power tools and the movement of heavy vehicles is less than 500 m from residential areas. If an exception to this provision is required, all residents within the 500 m radius should be given 1 week's written notice.</li> </ul>  |
| Rehabilitation        | Visual impact                  | <ul style="list-style-type: none"> <li>• Upon completion of the construction phase consultations should be held with the local community/property owner(s) regarding the post-construction use of remaining excavated areas (if applicable).</li> <li>• In the event that no post-construction uses are requested, all excavated/degraded areas need to be rehabilitated as follows: <ul style="list-style-type: none"> <li>○ Excavated areas may only be backfilled with clean or inert fill. No material of hazardous nature (e.g. sand removed with an oil spill) may be dumped as backfill.</li> <li>○ Rehabilitated excavated areas need to match the contours of the existing landscape.</li> <li>○ The rehabilitated area should not be higher (or lower) than nearby drainage channels. This ensures the efficiency of revegetation and reduces the chances of potential erosion.</li> <li>○ Topsoil is to be spread across excavated areas evenly.</li> <li>○ Deep ripping of areas to be rehabilitated is required, not just simple scarification, so as to enable rip lines to hold water after heavy rainfall.</li> </ul> </li> <li>• Ripping should be done along slopes, not up and down a slope, which could lead to enhanced erosion.</li> </ul> |
|                       | Landscaping and Rehabilitation | <ul style="list-style-type: none"> <li>• A Rehabilitation Plan/ Strategy must be compiled and implemented.</li> <li>• The Rehabilitation Plan must make provision for the rehabilitation of the vegetation on the sites to ensure that the vegetation resembles that of the surrounding areas.</li> </ul>  |

| Environmental Feature | Impact     | Management Actions   |
|-----------------------|------------|--|
|                       |            | <ul style="list-style-type: none"> <li>• Proper planning for rehabilitation is considered critical for ensuring that rehabilitation is successful.</li> <li>• Removal of all foreign debris, waste, cement/concrete, building materials and similar from the site and dispose of properly at a suitable landfill site.</li> <li>• Any active erosion features (e.g. dongas) need to be fixed/stabilised.</li> <li>• It is recommended that landscaping promote the use of indigenous species common to the region and that as much natural ground cover is established (naturally) on the site to help with binding soils and encouraging water infiltration, thus reducing overland flows and the pressure on stormwater management infrastructure.</li> <li>• Aftercare, maintenance, monitoring and evaluation of rehabilitation and re-vegetation efforts must be undertaken during and after rehabilitation has been completed. The monitoring and evaluation of rehabilitation activities and outcomes are critical in assessing the extent to which the rehabilitation plan has achieved what it set out to accomplish.</li> <li>• All areas disturbed by site establishment and prospecting activities must be subject to landscaping and rehabilitation;</li> <li>• All spoil and waste must be disposed of to a registered waste site;</li> <li>• Where impacted through site establishment-related activity, all sloped areas must be stabilised to ensure proper rehabilitation is effected and erosion is controlled;</li> <li>• Sloped areas are stabilised using vegetation as specified in the design to prevent erosion of embankments.</li> <li>• Spoil can be used for backfilling or landscaping as long as it is covered by a minimum of 150 mm of topsoil</li> </ul> |
| Social                | Job losses | <ul style="list-style-type: none"> <li>• Develop and implement a social closure plan, including the following measures:</li> </ul>   |

| Environmental Feature | Impact | Management Actions   |
|-----------------------|--------|--|
|                       |        | <ul style="list-style-type: none"> <li>○ Develop workers level of skill to a recognised industry standard to enable maximum employability post-decommissioning.</li> <li>○ Communicate intentions to decommission well in advance (6 months) to enable workers to seek alternate employment in the event that they seek to avoid formal retrenchment.</li> </ul> |

#### 4 RECOMMENDATIONS FOR MONITORING

In order to prevent and minimize the above-mentioned environmental impacts, the following site monitoring measures need to be done:

- Monitor whether provisions as set out in the EMP has been complied with.
- Non-compliance is to be recorded and discussed at weekly site meetings and timeous remedial actions taken.
- Should complaints be received regarding specific non-compliance matters continued communication should be held with the aggrieved parties until the matters are clarified.

#### 5 CONCLUSION

Based on the recommendation given in this EMP, GCS is confident that the proposed activities, as described in **Chapter 2** of the scoping report may be granted an Environmental Clearance Certificate, provided that the EMP is implemented and that all the legal requirements pertaining to this development are complied with.