UPDATED ENVIRONMENTAL MANAGEMENT PLAN (EMP)

FOR

THE OPERATION OF OTJI-BRICKS MANFACTURING AND PAVING FACTORY IN OTJIWARONGO, OTJOZONDJUPA REGION, NAMIBIA

ECC Application number: 004252

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1 INTRODUCTION

Herbert Henle (referred to as the proponent in this document) was issued an Environmental Clearance Certificate (ECC) (ECC-001163) for the operation of Otji-Bricks manufacturing and paving factory in the town of Otjiwarongo (coordinates: 16. 641045; -20. 454779), The ECC No. 001163 was issued and valid from 19 January 2021 till the 19 January 2024. The proponent intends to continue with the operation in order to meet the demand for bricks in the town and nearby places.

This document has been prepared as a legal requirement by Section 8 of the EMA, No. 7 of 2007 and its 2012 EIA regulations. The compilation of this EMP is also one of the outputs required of the Environmental Consultant (Environmental Assessment Practitioner (EAP), by The Proponent. It is required of the Environmental Consultant to comply with the EMA and provide for the following:

- Prepare a detailed updated Environmental Management Plan that can be used as guide to monitor compliance to the recommendations made in the EIA and to assist in managing and monitoring activities throughout the operation and maintenance manufacturing bricks and paving factory.
- The Environmental Consultant must clarify in the EMP, the roles and responsibilities of the Proponent, the contractors and any other identified stakeholders

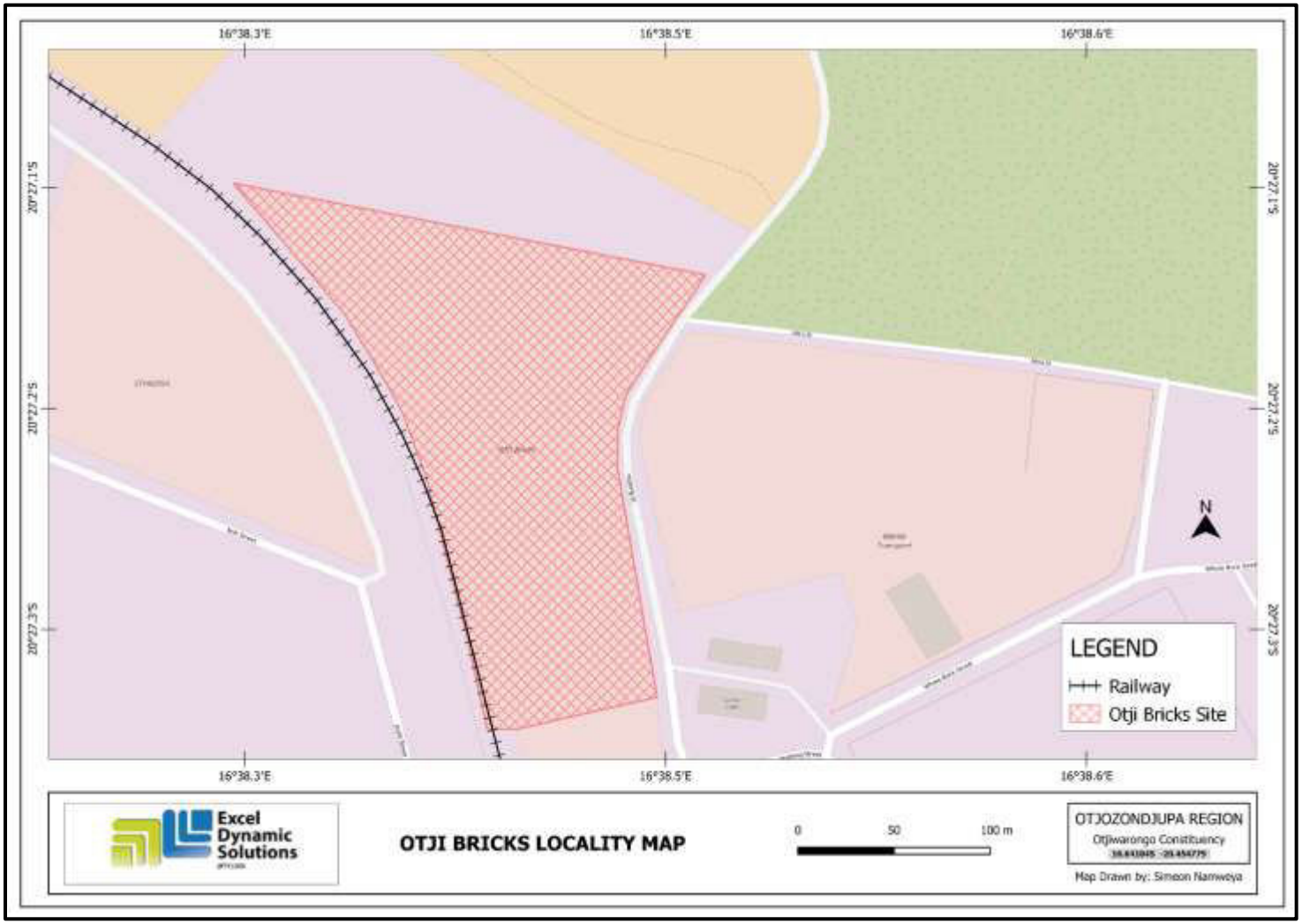

Figure 1 the farm map around the Otji-Bricks located in Otjiwarongo

1.1 Appointed Environmental Consultant

To ensure that the proposed activity is compliant with the national environmental legislation the Proponent appointed an independent environmental consultant, Excel Dynamic Solutions (Pty) Ltd, to compile an updated EMP to guide operations of manufacturing bricks and paving factory.

1.2 The Aim of the Environmental Management Plan (EMP)

Regulation 8(j) of the EIA Regulations (2012) requires that a draft Environmental Management Plan (EMP) shall be included as part of the Environmental Assessment (EA) scoping report. 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, as it synthesizes 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 EA process and the required mitigation measures to be implemented during operation. It is important to note that an EMP is a statutory 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 can be amended to adapt to address project changes and/or environmental conditions and feedback from compliance monitoring.

The purpose of this document is, therefore, to guide environmental management throughout the different phases of the existing manufacturing bricks and paving factory are namely: planning, production and decommissioning and rehabilitation phase:

- **Planning Phase** – This is the phase where the proponent deals with the necessary legislative and administrative arrangements on site.
- **Production Phase:** This is the phase where the proponent produces the required size of bricks as specified by the customer so they can be used for building purpose.
- **Decommissioning and Rehabilitation** – This is the phase during which the manufacturing bricks and paving factory activities cease. The decommissioning of the operations may be considered as a result of a decline in the target commodity. Before the decommissioning phase, the Proponent will need to put site rehabilitation measures in place.

Environmental Monitoring Requirements: In order to support and ensure that the proposed mitigation measures are achieving the desired results, a monitoring plan must be implemented alongside the mitigation plan. This draft EMP will be used by The Proponent, employees and/or contractors to provide management measures to be undertaken, to address the environmental impacts identified in the scoping report and ensure that the impacts on the environment are avoided, or limited if they cannot be avoided completely.

2 LEGAL OBLIGATIONS GOVERNING THE PROPOSED ACTIVITIES

The existing Otji Bricks facility and its associated activities needs to adhere to certain local, regional, national as well as international legal frameworks. The legal requirements provided herein are these in terms of permits or licensing that the Proponent will need to obtain prior to and during the site works and or renewal of permits throughout the cycle. These legal requirements are provided under **Table 1**.

Table 1: Applicable and required permits/authorizations/licenses for the operation of Otji-Bricks

Legislation/Policy/Guideline	Relevant Provision	Implication for the Project and Contact Institution/Person
Environmental Management Act (EMA) No. 7 of 2007	The Act requires that projects with significant environmental impacts are subject to an environmental assessment process (Section 27). The Act details principles which are to guide all EAs.	The EMA and its regulations should inform and guide this ESA process. The proponent will need to renew the ECC every 3 years, counting from the date of issue. Contact details at the Department of Environmental Affairs and Forestry (DEAF), Ministry of Environment, Forestry and Tourism (MEFT) **Office of the Environmental Commissioner** **Tel: +264 (0) 61 284 2701**
Environmental Impact Assessment (EIA) Regulations Government Notice 28-30 (Government Gazette 4878))	Details requirements for public consultation within a given environmental assessment process (Government Notice 30 Section 21). Details the requirements for what should be included in a Scoping Report (Government Notice 30 Section 8) and an Assessment Report (Government Notice 30 Section 15).	
Minerals (Prospecting and Mining) Act (No. 33 of 1992)	Section 48 (3): To enable the Minister to consider any application referred to in section 47 the Minister may (b) require the person concerned by notice in writing to (i) carry out or cause to be carried out such environmental impact studies as may be specified in the notice. Section 54(2): details provisions pertaining to the decommissioning or abandonment of a mine.	The Proponent should ensure that all necessary permits/authorization for the quarrying activities where the sand is obtained for making bricks from the Ministry of Mines and Energy (MME). **Office of the Mining Commissioner** **Tel: +264 61 284 8167**

Legislation/Policy/Guideline	Relevant Provision	Implication for the Project and Contact Institution/Person
Petroleum Products and Energy Act (No. 13 of 1990) Regulations (2001)	Regulation 3(2)(b) states that "No person shall possess or store any fuel except under authority of a licence or a certificate, excluding a person who possesses or stores such fuel in a quantity of 600 litres or less in any container kept at a place outside a local authority area"	The Proponent should obtain the necessary authorisation form the MME for the storage of fuel on-site. **Ministry of Mines and Energy: Acting Director – Petroleum Affairs** **Tel: +264 61 284 8291**
Labour Act 11 of 2007 Health and Safety Regulations (HSR) GN 156/1997 (GG 1617).	Adhere to all applicable provisions of the Labour Act and the Health and Safety regulations.	The protection of employees and contractors' labour rights and occupational health safety
Forestry Act 12 of 2001, Amended Act 13 of 2005	Prohibits the removal of any vegetation within 100 m from a watercourse (Forestry Act S22 (1)). The Act prohibits the removal of and transport of various protected plant species.	Should there be protected plant species, which are known to occur within the actual project site footprint, and require to be removed, a Permit should be obtained from the nearest Forestry Office (MEFT) prior to removing them. Contact Details at MEFT (Forestry Otjiwarongo Office), **Tel: +264 (0) 67 303 307**
National Heritage Act (Act No. 27 of 2004)	The Act makes provision for the protection and conservation of places and objects of heritage significance and the registration of such places and objects. Part V Section 46 of the Act prohibits removal, damage, alteration, or excavation of heritage sites or remains, while Section 48 sets out the procedure for application and granting of permits such as might be required in the event of damage to a protected site occurring as an inevitable result of development. Part VI	The Proponent is advised to make an application to the National Heritage Council for a Consent to allow Detailed Archaeological and Heritage Assessment Study of the MCs area. Contact: The Director of the National Heritage Council of Namibia (NHC):

Legislation/Policy/Guideline	Relevant Provision	Implication for the Project and Contact Institution/Person
	Section 55 Paragraphs 3 and 4 require that any person who discovers an archaeological site should notify the National Heritage Council. Section 51 (3) sets out the requirements for impact assessment. Should any objects of heritage significance be identified during the site clearing and excavations, the work must cease immediately in the affected sites and the necessary steps taken to seek authorisation from the Council.	OR Regional Heritage Officers at the NHC **Tel: +264 (0) 61 301 903**
The National Monuments Act No. 28 of 1969	The Act enables the proclamation of national monuments and protects archaeological sites.	
The Road Traffic and Transport Act No. 52 of 1999 and its 2001 Regulations	Provides for the control of traffic on public road and the regulations pertaining to road transport, including the licensing of vehicles and drivers.	Roads Authority- specialist Road legislation), Tel: +264 (0) 61 284 7072

3 DRAFT EMP IMPLEMENTATION, ROLES & RESPONSIBILITIES

As the project Proponent, Mr. Herbert Henle is ultimately responsible for the implementation of the EMP. However, they may delegate this responsibility at any time, as they deem necessary during the project (usually an environmental control officer or safety, health, and environmental person). The roles and responsibilities of all the parties involved in the effective implementation of this EMP are as follows:

3.1 Competent Environmental Monitoring Authorities (DEAF and Others)

The Department of Environmental Affairs and Forestry (DEAF) is responsible for enforcing compliance with the EMA, its regulations and full implementation of this EMP. The authority is also responsible for reviewing bi-annual audit reports submitted by the Proponent and grant ECC renewal after every 3 years following an environmental audit.

Further Monitoring institutions include but not limited to:

- **The National Heritage Council of Namibia:** for archaeological and heritage resources (sites and objects).
- **Ministry of Mines and Energy:** for compliance with the relevant mining and extraction requirements, including petroleum products' storage and handling on site.

3.2 The Mining manager (or the Proponent)

This Manager, *who may also be the Proponent*, is responsible for the following:

- Development and management of schedules for daily activities in compliance with the EMP.
- Managing/overseeing the implementation of this EMP and updating and maintaining it when necessary.
- Ensure that relevant commitments contained in the EMP Action Plans are adhered to.
- Ensure the relevant staff is trained in procedures entailed in their duties.
- Through consultations and cooperation with the ECO/SHE officer, issuing fines to individuals who may be in breach of the EMP provision and if necessary, removing such individuals from the site.
- Setting up and managing the schedule for the day-to-day activities.
- Ensuring all incidents are recorded and documented.

- Undertaking an annual review of the EMP and amending the document when necessary.

3.3 Safety, Health and Environmental (SHE) or Environmental Control Officer (ECO)

The SHE or ECO (as appropriate) is responsible for ensuring that project activities are completed on time, efficiently and sustainably. The ECO/SHE Officer's duties and responsibilities will include:

- The SHE Officer will be responsible for the following activities:
- Planning and carrying out site inductions to the workers on-site and visitors to the worksite(s).
- Ensuring compliance with relevant environmental and related authorizations and license conditions.
- Ensure that the requirements of the EMP are carried out during applicable activities throughout the project life span.
- Monitor the overall implementation of the EMP.
- Identifying and appointing appropriately qualified specialists (were necessary) to undertake the program in a timeous manner and to acceptable standards.

3.4 Public Relation Officer (PRO)

The Public Relation Officer is responsible for the following tasks:

- Liaison between the affected farmers (property owners) and/or occupiers of land as well as other stakeholders, and the Proponent.
- Ensure effective communication with stakeholders (affected farmers or landowners or occupiers of land), media (if necessary) and the public.
- Managing public relations issues.
- Preparing and submitting public relations reports, if required.
- Collaborating with personnel and maintaining project-related open communication among personnel.
- Cooperate with all relevant interested and affected parties/stakeholders.

3.5 Archaeology: Chance Finds Procedure (CFP) Implementation Roles

The following personnel have been assigned responsibilities as per the Chance Finds Procedure **(Appendix 1)** as per the provided Archaeological and Heritage Assessment Studies conducted for the proposed activities:

A. Operator

To exercise due caution if archaeological remains are found

B. Foreman

To secure site and advise management timeously

C. Superintendent

To determine safe working boundary and request inspection

D. Archaeologist

To inspect, identify, advice management, and recover remains.

The Proponent should assess these commitments in detail and should acknowledge their obligation to the specific management actions detailed in the Tables of the following sections.

4 ENVIRONMENTAL MANAGEMENT & MITIGATION ACTION PLANS

The environmental management and mitigations measures (management plan actions) provided to the potential adverse impacts associated with the proposed project and its activities are presented under this chapter. The aim of these plan actions is to avoid these potential impacts where possible, and where avoidance is impossible, measures are provided to reduce the impacts' significance (as presented under the impacts' assessment chapter of the Scoping Report).

4.1 Key potential Negative/ (Adverse) Impacts

The key potential adverse impacts for which the measures have been developed are as follows:

- Impacts on Biodiversity and Land
- Impact on Water Resources
- Generation of dust
- Generation of waste
- Visual impacts (scars) on landscape,
- Impact on Surrounding Soils
- Vibrations and noise
- Possible disturbance to heritage/archaeological resources
- Potential occupational health and safety risks
- Impacts associate with closure and decommissioning of works (rehabilitation).

4.2 The Management and Mitigation of Potential Key Negative Impacts

The management and mitigation measures (action plans) for the potential adverse impacts are presented in **Table 2** for the planning, and operational and maintenance phases.

The required management and mitigation plan actions have been presented under **Table 2** in terms of (a) Environmental aspect and issues for which management actions are required, (b) proposed impact mitigation measures, (c) key performance indicator (KPI) for monitoring success levels of management actions, (d) responsible person(s) for implementing the proposed management actions, (e) resources required for implementing management actions and monitoring and (f) implementation timeframes for the proposed management actions.

Table 2: Management and Mitigation Measures for the Operational Phase

Aspect	Impact	Management & Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
PLANNING PHASE						
EMP implementation and training	Lack of EMP awareness and implications thereof	-A Comprehensive Health and Safety Plan for the project activities should be compiled. This will include all the necessary health, safety, and environmental considerations applicable to respective works on sites. -An EMP non-compliance penalty system should be implemented on site. -The Proponent should appoint an SHE Officer to be responsible for managing the EMP implementation and monitoring.	-All required Plans and systems are compiled and in place. A SHE officer or Environmental control Officer (ECO) is appointed.	-Proponent	-Records of EMP implementation Plans and Systems	Throughout the project activities
Authorizations	Lack of Agreements, Permits/ Licenses	-All the required agreements and licenses or permits should be applied for and signed, respectively as required. -The permits, agreements referred to herein include land access & use (by land/farm or property	-Applicable permits and licenses to obtained from relevant authorities and kept on site for records keeping and future inspections -Agreements signed and obtained from	-Proponent	-Permits and Licenses	Prior to production phase

Aspect	Impact	Management & Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
		owners or representatives of the occupiers of land) as well as petroleum storage permits from Ministry of Mines and Energy (MME).	landowners or occupiers of land on time, minimum of 2 months prior to planned commencement date of onsite works -Onsite petroleum storage permits obtained		Signed Land Access and Use Agreements	
Communication between the Proponent and landowners or occupiers of land	Lack of communication (proper liaison) between farmers and Proponent with regards to land use	-The Proponent should appoint a Public Relation Officer (PRO) to liaise with the landowner and or custodian -The PRO should be introduced to the farm/landowners and his or her contact details provided to them prior to undertaking activities for easy communication during the project. -A clear communication procedure/plan which should include a grievance mechanism should be compiled	-A PRO is appointed -Ongoing Stakeholders' and Public Engagement & Consultation throughout the project cycles, when and as required	-Proponent	-Complaint's logbook -PRO contact details to be provided to the affected farmers/landowners -Records of Stakeholders' and Public Consultations	PRO appointment (Prior to project activities) and their responsibilities throughout the rest of the project phases

Aspect	Impact	Management & Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
Employment	Creation of employment opportunities for the locals	-Preference of local residents for employment for jobs should be prioritised, i.e., employment of non-residents should be justified. -Equal opportunity should be provided for both men and women, when and where possible.	-Number of locals employed for bricks making activities -Consultation with the constituency councillor's office and local development committee -Notification via the Constituency Office	-Proponent in collaboration with the site Manager (if necessary)	-Record of employees -Constituency Council office to assist in identifying unemployed people	Throughout the project activities and when necessary, throughout.

Aspect	Impact	Management & Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
Corporate Social Responsibility (CSR)	Social commitment failures	-Consider providing and or donating services such as water supply boreholes to the community they are operating in through the identification of people in need. -Infrastructure can be donated to the community through the relevant local authorities at decommissioning. -The project owner (Proponent) should fulfil any promises of CSR, upon proper consultation with the local development committees to establish what the community really needs.	-Visible commitment to ensure that the local community is benefitting from the project	-Proponent	-Office of the Constituency Councillor -Local Development Committee to monitor implementation of the CSR	Throughout the project
Maintenance Phase						

Aspect	Impact	Management & Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
EMP implementation and training	Lack of EMP awareness and implications thereof	-EMP training should be provided to all new workers on site and to old workers (as a refresher) every 6 months. -All site personnel should be aware of necessary health, safety, and environmental considerations applicable to their respective work -The implementation of this EMP must be monitored. -The site should be inspected, and a compliance audit done throughout **the project. Compliance monitoring reports submitted to the DEAF bi-annually.** -An EMP non-compliance penalty system must be implemented on site.	-Compliance monitoring conducted regularly and should be recorded -EMP Refresher training for employees/workers every 6 months -Timely renewal of the Environmental Clearance Certificate (ECC)	-SHE Officer	Bi-annual Environmental Audit reports Record the EMP training conducted!	Throughout the operation phase and as required
Land use (physical soils)	Physical soil/land disturbance	-Overburden should be handled efficiently. -Project vehicles/machinery should stick to access roads provide and or meant for	-No proliferation of informal vehicle tracks. -No new erosion gullies.	SHE Officer/ECO	-Complaint's logbook	Throughout the project

Aspect	Impact	Management & Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
		the project operations but not to unnecessarily create further tracks on site by driving everywhere resulting in soil compaction.				
Water resource	Over-abstraction (Water demand and availability)	Although water there is underground water abstraction, the Proponent should be water-use conscious and consider voluntary water use reduction by sticking to their proposed threshold volumes or less when possible.	- Water supply agreements Proof/ recording/ quantification of water saving efforts.	Proponent Site/Project Manager	Water supplier Proponent Water storage tanks on site	Once off supply agreement Throughout the phase

Aspect	Impact	Management & Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
		The Proponent should aim to use water efficiently, recycle and re-use where necessary and possible. Water reuse/recycling methods should be implemented as far as practicable during operations. Water used to cool off operational equipment should be captured and used for the cleaning of project equipment, if possible. Water conservation awareness and saving measures training should be provided to all the project workers to promote water conservation and staff accountability.				
Soil and water resources	Soil and water resources pollution	Oil and wastewater spill control preventive measures should be in place on site to manage soil contamination and prevent spills from reaching ground and surface water bodies. Some of the preventive	-No complaints of pollutants on the soils and eventually in the water due to the operation activities -No visible oil spills on the ground or	-SHE Officer	-Complaint's logbook -Waste containers -Non-permeable material to cover	Throughout project

Aspect	Impact	Management & Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
		measures that can be implemented include: (a) Identification of oil storage and use locations on site and allocate drip trays and polluted soil removal tools suitable for that specific surface (soil or hard rock cover) on the sites. (b) Maintain equipment and fuel storage tanks to ensure that they are in good condition thus preventing leaks and spills. (a) The fuel storage and use locations should be visually inspected for container or tank condition and spills. (b) Maintain a fully provisioned, easily accessed spill kit. Spill kits should be located throughout the active project sites contain the floor dry absorbent material and absorbent booms, pads, mats. These would be suitable for ground surface areas that	contaminated/polluted spots.		the ground surface at areas where hydrocarbons and potential pollutants are utilized.	

Aspect	Impact	Management & Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
		are covered mainly by hard rocks. -All project employees should be sensitized about the impacts of soil pollution and advised to follow appropriate fuel delivery and handling procedures. -The Proponent should develop and prepare countermeasures to contain, clean up, and mitigate the effects of an oil spill. This includes keeping spill response procedures and a well-stocked cache of supplies easily accessible. -Ensure employees receive basic Spill Prevention, Control, and Countermeasure (SPCC) Plan training and mentor new workers as they get hired. -Surfaces of sites where hydrocarbons will be utilized should be covered with an impermeable plastic liner (e.g., an HDPE liner), carefully placed to				

Aspect	Impact	Management & Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
		minimize risk of puncturing, to prevent any spillages from getting into direct contact with the soils and prevent infiltration into the ground, and eventual groundwater pollution. -Project machinery and equipment should be equipped with drip trays to contain possible oil spills when operated on site. -In cases of accidental fuel or oil spills on the soils from site vehicles, machinery and equipment, the polluted soil should be removed immediately and put in a designate waste type container for appropriate disposal. The removed polluted soil should either be completely disposed of or cleaned/remediated and returned to where it was taken from on site, or can be replaced with a cleaner soil. **-Drip trays must be readily available and monitored to ensure that**				

Aspect	Impact	Management & Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
		accidental fuel spills along the tank trailer path/route around the sites are cleaned on time (soon after the spill has happened). **-Polluted soil must be collected and transported away from the site to an approved and appropriately classified hazardous waste treatment facility.** -Washing of equipment contaminated hydrocarbons, as well as the washing and servicing of vehicles should take place at a dedicated area, where contaminants are prevented from contaminating soil or water resources. - Ablution waste, if not connected to a local sewer system, should be treated by discharging before the available systems reach capacity and transported to a wastewater treatment facility.				

Aspect	Impact	Management & Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
Biodiversity	Loss of Fauna and Flora	**Flora:** The Proponent should avoid unnecessary removal of vegetation. Movement of vehicle and machinery should be restricted to existing roads and tracks to prevent unnecessary damage to the vegetation. Make use of the existing road network as much as possible and avoid off-road driving, to minimize onsite floral destruction. Vegetation clearing to be kept to a minimum. Vegetation clearing should only be applied where necessary and within the development footprint. No-go areas should be identified prior to operation to prevent disturbances in the current preserved ecosystems. Environmental awareness on the importance of floral biodiversity preservation	-Incident reports of illegal hunting of wildlife by the project crew/workers. -No complaints of livestock theft, snaring or killing of livestock and wildlife by the project personnel -No disturbance to unmarked areas. No complaints from locals regarding unauthorised vegetation removal or cutting down of trees	-SHE Officer	- Barricading tape (to indicate working areas) -Complaint's logbook	During site set up, and throughout the project

Aspect	Impact	Management & Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
		should be provided to the workers. **Fauna:** -Workers should refrain from disturbing, killing or stealing livestock and wildlife, and killing small soil and rock outcrops' species found on site. -Poaching of wildlife from the area is strictly prohibited. -Environmental awareness on the importance of biodiversity preservation should be provided to the workers.				

Aspect	Impact	Management & Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
					-Anti-poaching unit of the Namibian Police Force -MEFT's Wildlife Protection Unit	
Air Quality	Air quality (dust)	-Project vehicles should not drive at a speed more than 40 km/h, to prevent excessive dust generation around the site. -The Proponent should ensure that the operations schedule is limited to the number of days as agreed upon in land use agreements. This will keep the vehicle-related dust level minimal in the area. -Dust control measures such as reasonable amount of water sprays should be used on gravel roads to suppress dust. -Dust masks, eye protective glasses and other respiratory personal protective equipment (PPE) such as face masks should be provided to the	-Dust suppression measures implemented -Visible efforts to curb dust	-Site Manager -SHE Officer	-Grievance logbook -Dust suppression water tanks	Throughout the phases

Aspect	Impact	Management & Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
		workers on site during operations where they are exposed to dust. -Mining equipment should be regularly maintained to ensure efficiency and reduce dust generation and harmful gaseous emissions.				
Littering and Waste management (General waste and sanitation)	Environmental pollution	-Workers should be sensitized to dispose of waste in a responsible manner. -All domestic and general operational waste produced daily should be contained until such that time it will be transported to designated waste sites. -No waste may be buried or burned on site or anywhere else and no waste must be left on site. -The site should be equipped with separate waste containers for hazardous and non-	-A register of all waste generated on site is kept on site. -All waste disposal permits from relevant authorities are available on site. -No littering on and around the project site	-Proponent -SHE Officer	-Waste storage containers	Throughout the phases.

Aspect	Impact	Management & Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
		hazardous (general/domestic) waste. -Hazardous waste, including emptied chemical containers should be safely stored on site where they cannot be accessed and used by uniformed locals for personal use. These containers can be transported to the nearby approved hazardous waste sites for safe disposal. No waste should be improperly disposed of on site or in the surroundings, i.e., on unapproved waste sites. -Oil spills should be taken care of by removing and treating soils affected by the spill. -A penalty system for irresponsible disposal of waste on site and anywhere in the area should be implemented. -Careful storage and handling of hydrocarbons on site is essential.				

Aspect	Impact	Management & Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
		-Potential contaminants such as hydrocarbons and wastewater should be contained on site and disposed of in accordance with municipal wastewater discharge standards so that they do not contaminate surrounding soils and groundwater. -An emergency plan should be available for major/minor spills at the site during operation activities (with consideration of air, groundwater, soil and surface water) and during the transportation of the products(s) to the sites.				
	Wastewater generated by site workers living on-site.	-Washing of hydrocarbon contaminated equipment, and the washing and servicing of vehicles should take place at a dedicated area, where contaminants are prevented from contaminating soil or water resources.	-Adequate ablution facilities on site.	-Site Manager -SHE Officer	-Chemical toilets, waste treatment agents/chemicals -Wastewater discharge permits	At site setup and throughout phase

Aspect	Impact	Management & Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
		-All wastewater and hydrocarbon substances and other potential pollutants associated with the project activities should be contained in designated containers on site and later disposed of at nearby approved waste sites in accordance with MAWLR's Water Environment Division standards on wastewater discharge into the environment. This is to ensure that these hazardous substances do not infiltrate into the ground and affect the local groundwater quality.				
Noise	Noise	-Noise from project machinery and equipment on site should be at acceptable levels. -Working hours should be restricted to between 08h00 and 17h00, or the hours agreed upon in land use agreements, to avoid noise and vibrations generated by operational	-Noise generating activities such as drilling limited to weekdays only. -PPE provided to workers operating noisy equipment and in noisy site areas.	-Site manager -SHE Officer	-Clearly written placards with operational hours in a day placed at one of the visible access roads to sites	Throughout the project phases

Aspect	Impact	Management & Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
		equipment and vehicles before or after hours. -When operating the machinery onsite, workers should be equipped with personal protective equipment (PPE) such as earplugs to reduce exposure to excessive noise, especially during activities such as blasting.				
Health and Safety	Occupational & Community Health and Safety	-The Proponent should commit to and make provision for full medical examinations for all the workers at site to monitor the impact of project related activities on them (workers). -As part of their induction, the project workers should be provided with an awareness training of the risks of mishandling equipment and materials on site as well as health and safety risk associated with their respective jobs. -When working on site, employees should be properly equipped with	-Compilation of Comprehensive Health and Safety Plan -Regular health screening of workers -Bi-annual health and safety audits done. -All onsite workers and visitors equipped with PPE.	-Site Manager -Proponent -SHE Officer	-Health and Safety Policies -Funds to acquire health and safety related equipment. and to pay for employee medical services -First Aid training for at least 1 personnel at each work site	

Aspect	Impact	Management & Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
		adequate personal protective equipment (PPE) such as overalls, gloves, safety boots, earplugs, dust masks, safety glasses, hard hats etc. -Heavy vehicle, equipment and fuel storage site should be properly secured, and appropriate warning signage placed where visible. -Any drilled boreholes on site that will no longer be in use or to be used later after being drilled should be properly marked for visibility and capped/closed off. -Ensure that after completion of any drilling, drill cuttings are put back into the hole and the holes filled and levelled. -An emergency preparedness plan should be compiled, and all personnel appropriately trained.				

Aspect	Impact	Management & Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
		-Workers should not be allowed to consume any intoxicants prior to and during working hours, nor allowed on site when under the influence. -The site must be equipped with cautionary signs for any potential danger or risk areas identified on site.				
Fires	Accidental fire outbreak	-Portable fire extinguishers should be provided on site. -No open fires to be created by project personnel. -Potential flammable areas and structures should be marked as such with clearly visible signage.	-No Fires recorded (due to presence of workers)	-Site Manager -SHE Officer	-Fire extinguishers (1 per vehicle) and 1 per working site	Throughout the phases
Archaeology and heritage	Accidental disturbance and destruction of archaeological or heritage objects and sites	-The management and mitigations or recommendation to handle archaeological finds discovered during operations are presented in Appendix 1.	-Preservation of all artefacts that are discovered around project area -Cessation of work upon discovery/unearthing of unknown objects	-Site Manager -SHE Officer - Archaeologist	-Technical Consultant (Archaeologist to help identify and advise on heritage object discovery) -Salvage equipment -Flag tapes -GPS (site marking)	-Archaeologist to be present on-site during excavations

Aspect	Impact	Management & Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
Social conflicts	Property intrusion and disturbance	-The Proponent should inform their workers on the importance of respecting the locals' properties by not intruding or vandalizing property or snaring and killing their livestock and wildlife. -Any workers or site employees that will be found guilty of intruding private property should be dealt with as per their employer' (Proponent)'s code of employment conduct -No worker should be allowed to wander or loiter on private property without permission. -No worker should be allowed to, without permission cut down or	-Project workers are educated on what is expected of them while on site in relation to the private and public properties -No complaints of damage to private or public properties by project workers or activities	-Site mananger -SHE Officer	-Anti-property intrusion or damage pamphlets or placards placed at the site -Fines for any intentional damage or disturbance of private or public property	Throughout the phases

Aspect	Impact	Management & Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
		damage trees on the property.				
	Traffic safety	-Heavy truck loads should comply with the allowed speed limits for respective vehicles while transporting material on the site and on public roads. -Drivers of all project phases' vehicles should be in possession of valid and appropriate driving licenses and adhere to road safety rules. -Drivers should drive slowly (40km/hour or less) and be on the lookout for livestock and wildlife as well as residents/workers on the site. -The Proponent should ensure that the site roads are well equipped with temporary road signs	-Site access road permits obtained, and requirements fulfilled -No complaints from members of the public regarding vehicular traffic issues related to the project -All personnel operating the project vehicles and machinery are appropriately licensed and possession of valid driving licenses. -The vehicles are driven at the recommended speed. -Demarcated areas for parking, offloading, and loading zones are on sites	-SHE Officer	-Vehicular traffic compliance to be included in the annual environmental audit reporting	Throughout the phases.

Aspect	Impact	Management & Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
		conditions to cater for vehicles utilizing the site. -Project vehicles should be in a road worthy condition and serviced regularly to avoid accidents owing to mechanical faults. -Vehicle drivers should only make use of designated site access roads provided and as agreed. -Vehicle drivers should not be allowed to operate vehicles while under the influence. -Sufficient parking space for all project vehicles should be provided and clearly demarcated on sites. -The Proponent should make provision for safe loading/offloading of material and equipment on site. -No heavy trucks or project related vehicles should be parked outside the project site boundary or				

Aspect	Impact	Management & Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
		demarcated areas for such purpose. -To control traffic movement on site, deliveries from and to site should be carefully scheduled. This should optimally be during weekdays and between the hours of 8am and 5pm. -The site access road(s) should be kept at an acceptable standard to be able to accommodate project related vehicles and access permits obtained from the Roads Authority.				

4.3 Rehabilitation and Decommissioning measures

Successful rehabilitation requires careful consideration of the local ecological context in combination with rehabilitation goals. The most important steps in undertaking a successful rehabilitation are planning and environmental awareness (environmental education) on the importance of progressive rehabilitation (or post-activity rehabilitation) and its importance to the environment. Furthermore, to successfully implement the planned rehabilitation, practically, this will depend on a few factors, namely the rehabilitation program, characteristics of the site, nature of disturbance, rehabilitation methods, as well as resources availability.

The management and mitigation measures (action plans) for the rehabilitation and decommissioning of explored sites and site works, respectively are presented in **Table 3**.

Table 3: Management and Mitigation Measures to rehabilitate the sites and decommissioning of the site works

Aspect	Impact	Management & Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
Rehabilitation	Damaging of land and soils	-Backfilling of all excavated pits and trenches with loose materials but not only be filled with sand alone, as wind will scours the sand and re-establish the holes. -Provision of both financial and technical resources for progressive rehabilitation and post- manufacturing bricks and paving factory activities should be made.	-No stockpiled topsoil (topsoil is levelled after completion of each work) -Visible signs of stockpiled topsoil -Annual update of finances reserved for decommissioning and rehabilitation	-Proponent	-Waste containers on sites -Photo records of backfilled sites -Records of campsite and other structures onsite Records of finances set aside for decommissioning activities	Pre-site abandonment
Decommissioning	Structures and infrastructure	-All accumulated waste (hazardous, solid, and general) up until the cessation of operation must be removed from site and transported to designated off site waste management facilities -Removal of project vehicles and equipment from the site. -All project support structures such as ablution facilities, campsites or accommodation	-No sign of waste or littering seen on site and around site areas -project structures and infrastructure Campsite dismantled, and materials taken away from site	-Proponent		

Aspect	Impact	Management & Mitigation Measure(s)	Key Performance Indicator (KPI)	Responsible Person	Resources	Timeline
		facilities, temporary field offices and storage containers/tanks shall be demolished, and the waste taken to designated sites. The areas where these structures were set up must be rehabilitated to pre-operational state.				

APPENDIX 1: CHANCE FINDS PROCEDURE (AFTER KINAHAN, 2020)

Areas of proposed development activity are subject to heritage survey and assessment at the planning stage. These surveys are based on surface indications alone, and it is therefore possible that sites or items of heritage significance will be found during development work. The procedure set out here covers the reporting and management of such finds.

Scope: The "*chance finds*" procedure covers the actions to be taken from the discovery of a heritage site or item to its investigation and assessment by a trained archaeologist or other appropriately qualified person.

Compliance: The "chance finds" procedure is intended to ensure compliance with relevant provisions of the National Heritage Act (27 of 2004), especially Section 55 (4): "*a person who discovers any archaeological …. Object ……must as soon as practicable report the discovery to the Council*". The procedure of reporting set out below must be observed so that heritage remains reported to the NHC are correctly identified in the field.

Responsibility:

Operator: To exercise due caution if archaeological remains are found.

Foreman: To secure site and advise management timeously.

Superintendent: To determine safe working boundary and request inspection.

Archaeologist: To inspect, identify, advice management, and recover remains.

Procedure:

Action by person identifying archaeological or heritage material

a) If operating machinery or equipment stop work

b) Identify the site with flag tape

c) Determine GPS position if possible

d) Report findings to foreman

Action by foreman

a) Report findings, site location and actions taken to superintendent

b) Cease any works in immediate vicinity

Action by superintendent

a) Visit site and determine whether work can proceed without damage to findings

b) Determine and mark exclusion boundary

c) Site location and details to be added to project GIS for field confirmation by an archaeologist

Action by Archaeologist

a) Inspect site and confirm addition to project GIS

b) Advise NHC and request written permission to remove findings from work area

c) Recovery, packaging and labelling of findings for transfer to National Museum

In the event of discovering human remains

a) Actions as above

b) Field inspection by archaeologist to confirm that remains are human

c) Advise and liaise with NHC and Police

d) Recovery of remains and removal to National Museum or National Forensic Laboratory, as directed.

The competent authorities' contact details to report archaeological sites or objects Site Manager and contractor) are as follows:

- National Heritage Council (NHC) of Namibia (061 244 375) or direct contact with the Regional Heritage Officers at the NHC 061 301 903
- National Museum (+264 61 276800),
- National Forensic Laboratory (+264 61 240461).