SAND AND GRAVEL MINING FROM EXISTING BORROW PITS, ONIIPA TOWN COUNCIL (ONPTC)

ENVIRONMENTAL MANAGEMENT PLAN

November 2021

WINPLAN
TOWN & REGIONAL PLANNING CONSULTANTS

Project Title:	**ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR SAND AND GRAVEL MINING, ONIIPA TOWN COUNCIL (ONPTC)**
Type of Project:	**ENVIRONMENTAL MANAGEMENT PLAN**
Project Location:	**ONIIPA TOWN, OSHIKOTO REGION**
Approving Authority	**DIRECTORATE OF ENVIRONMENTAL AFFAIRS** **MINISTRY OF ENVIRONMENT AND TOURISM** **PRIVATE BAG 13306** **WINDHOEK**
Proponent/Client:	**ONIIPA TOWN COUNCIL** **ELCIN HEAD OFFICE BUILDINGS- ONIIPA** **MAIN ROAD 121** **ONIIPA** **TEL: 065 245700** **MOBILE: 081 251 9024** **E-MAIL: DNICODEMUS@ONIIPATC.ORG.NA**
Consultancy:	**WINPLAN** **PO BOX 90761, KLEIN WINDHOEK** **TEL.: (061) 246 761** **E-MAIL: winplan@winplan.com.na**

TABLE OF CONTENTS

TABLES

FIGURES

GLOSSARY

Activity:	The physical work that a proponent proposes to construct, operate, modify, decommission or abandon or an activity that a proponent proposes to undertake.
Alien Species:	It refers to a non-indigenous plant, animal or micro-organism; or an indigenous plant, animal or micro-organism, translocated or intended to be translocated to a place outside its natural range of nature, that does not normally interbreed with individuals of another kind, including any subspecies cultivar, variety, geographic race, strain, hybrid or geographically separate population.
Assessment:	The process of identifying, predicting and evaluating the significant effects of activities on the environment; and the risks and consequences of activities and their alternatives and options for mitigation with a view to minimise the effects of activities on the environment.
Batch Plant:	Machinery used on site for the mixing and production of concrete and associated equipment and materials.
Bund:	An enclosure designed to hold at least 120% of the contents of a liquid storage vessel, tank or drums to contain any spillage.
Construction Activity:	A construction activity is any action taken by the contractor, his subcontractors, suppliers or personnel during the construction process.
Environment	An interconnected system of natural and human-made elements such as land, water, air, all living organisms and matter from nature as well as cultural, historic, economic and social heritage and values.
Environmental Management Plan (EMP):	A plan that describes how activities that may have significant environments effects on the environment are to be mitigated controlled and monitored.
Contaminated Water:	Water contaminated by the activities of the contractor, e.g. concrete water and runoff from plant/personnel wash areas.
Contractor:	The principal person or company, including all subcontractors, undertaking the construction of the development as appointed by the proponent.

Construction Camp:	Refers to all storage stockpiles sites, site offices, container sites, other areas required to undertake construction and rest areas for construction staff or management.
Environmental Control Officer (ECO):	A suitably qualified professional who oversees the construction phase and ensure that all environmental specifications and EMP obligations are met during the phase. The ECO will be responsible for the monitoring, reviewing and verifying of compliance with the EMP by the contractor.
Emergency Situation	An incident, which potentially has the ability to significantly impact on the environment, and which, could cause irreparable damage to sensitive environmental features. Typical situations entail amongst others the: • Spill of petroleum products and lubricants into the aquatic system; • Potential damage, erosion and slumping of unstable river embankments or drainage channels; • Potential event of impeding the continuous flow of water to downstream water users dependant on the flow; and • Dangerous situation where livestock and children can be injured by any activity emanating from the construction or rehabilitation of the project implementation.
Environment:	The complex of natural and anthropogenic factors and elements that are mutually interrelated and affect the ecological equilibrium and the quality of life, including : (a) The natural environment that is the land, water and air, all organic and inorganic material and all living organisms; and (b) The human environment that is the landscape and natural, cultural, historical, aesthetic, economic and social heritage and values.
Environmental Impact Assessment (EIA):	The process of examining the environmental effects of a development as prescribed by the Environmental Impact Assessment Regulations (GN. No. 30 of 2012) for activities listed as List of Activities which may not be undertaken without an Environmental Clearance Certificate from the Environmental Commissioner (GN. No. 29 of 2012).
Hazardous Substance:	A substance that, in the reasonable opinion of the engineer and/or ECO, can have a harmful effect on the environment.

Listed Activity:	An activity listed in terms of section 27(2) of the Environmental Management Act and the List of Activities which may not be undertaken without an Environmental Clearance Certificate from the Environmental Commissioner (GN. No. 29 of 2012).
Mitigation	The implementation of practical measures to reduce adverse impacts of to enhance beneficial impacts.
Monitoring:	Regular inspection and verification of construction activities for degree of compliance to the EMP.
No-Go Areas:	Areas identified as being environmentally sensitive in some manner and demarcated on plan, and on the site with pegs or fencing and which are out of bounds to unauthorised persons. Authorisation must be obtained prior to entry.
Project Engineer:	The person(s) who represents the proponent and are responsible for the technical and contractual implementation of the works to be undertaken by the appointed contractors.
Proponent:	The legal entity duly authorised and appointed representative, with rights to undertake the development.
Rehabilitation	Restoring a disturbed area to more or less its natural state.
Resident Engineer (RE):	A person who represents the project engineer on site and is responsible for the technical and contractual implementation of the works to be undertaken.
Search and Rescue:	The location and removal of specified plant species, without unnecessary damage, and their transfer to a specified location (on-site nursery).
Solid Waste:	All solid waste, including construction debris, chemical waste, excess cement/concrete, wrapping materials, timber, tins and cans, drums, wire, nails, food and domestic waste.
Species of Special Concern:	Those species listed in the Endangered, Threatened, Rare, Indeterminate, or Monitoring categories of the South African Red Data Books, and/or species listed in Globally Near Threatened, Nationally Threatened or Nationally Near Threatened categories (Barnes, 1998).
Specification:	A technical description of the standards of materials and workmanship that the Contractor is to use in the works to be executed, the

	performance of the works when completed and the manner in which payment is to be made.
Topsoil:	The top 150 mm of soil (topsoil) and root material of cleared vegetation.
Works:	The construction operations and all related and incidental works, such as search and rescue, fencing and rehabilitation, in connection with the execution and carrying to completion of the project.

1. INTRODUCTION

This document constitutes the Environmental Management Plan (EMP) for existing sand and gravel borrow pits. The borrow pits are situated within the boundaries of the Oniipa Town Council (ONPTC), and are used to source sand and gravel materials for construction and other developmental projects within the town. The borrow pits has been used by the town council, long before the enactment of the Environmental Management Act (Act No. 7 of 2007), also referred to as the EMA and EIA regulations (GN No: 30 of 2012).

In November 2018, an Environmental Clearance Certificate was obtained, and the mining activities was legalized up to this point. Within this month (November 2021) the ECC will lapse, because it is only valid for a period of 3 years. Winplan is appointed to renew the ECC in order for the mining activities to continue being legal in the future. To comply with the EMA, ONPTC enlisted the services of Winplan to revise the Environmental Management Plan (EMP) as part of the application to renew the Environmental Clearance Certificate (ECC) for the existing sand and gravel borrow pits.

1.1 THE NEED FOR SAND AND GRAVEL

Sand and gravel are fundamental in the construction of roads and buildings and general construction, which are the building blocks for socio-economic development.

1.2 SAND AND GRAVEL MINING CAUTION

Sand and gravel are essential for socio-economic development, but these activities require efficient and effective management to ensure economic and environmental sustainability, should therefore conducted in a responsible and cautious manner.

1.3 PURPOSE OF THE EMP

The EMP is a legally binding document that forms an important parts of the Environmental Assessment process as required by the Namibian Environmental Management Act (No. 7 of 2007) and EIA regulations of 2012. The EMP provides necessary mitigation measures and recommended actions as well as responsibilities of actions to be applied to the possible negative impacts in respect of sand and gravel extraction operation. The EMP is divided into two parts, the operation and rehabilitation phase of which each phase contains specific mitigation measures and recommended actions. It is important to note that the North Central Areas of Namibia is currently experiencing 2 massive illegal sand and gravel mining thus every effort must be made to ensure that proper guidelines and procedures for sand mining are followed.

1.4 PROPONENT'S RESPONSIBILITY TO THE EMP

As the proponent, the Oniipa Town Council (ONPTC) holds the mandate and sole responsibility of managing the sand and gravel mining activities and should ensure that any other person (its own staff, contractor / subcontractor) adheres to the EMP. Therefore, the ONPTC should ensure that each and every team (its own staff, contractor / subcontractor) to be engaged in the sand mining activity should be given a copy of the EMP and an induction should be conducted with each team before deployment and commencement of sand or gravel mining activities. Each team leader should have a copy of the EMP available at all times and should be able to furnish the EMP to MET or any other law enforcement officer during environmental audit or any other random inspection.

1.5 POSSIBLE ADJUSTMENTS TO THE EMP

The EMP is an open ended document and can be considered inconclusive. This implies that, in-addition to the information contained in the EMP, any other relevant information gained during the actual sand and gravel mining activities, internal monitoring or auditing by MET can be added to the EMP (evolution of activities), and such changes will be binding to ONPTC, and all contractors / sub-contractors.

2. COMPLIANCE AND LEGAL REQUIREMENTS

2.1 Compliance to the EMP

The EMP is binding to the proponent, and all contractors / sub-contractors to be engaged in Sand and Gravel mining activities. This implies that every entity that may have any kind of engagement or involvement should adhere and comply with the EMP throughout the project lifespan. Non-compliance may have serious consequences e.g. withdrawal of licenses by the authorities, which could mean closure of the project prior to completion of all intended activities. In-addition, the EMP does not only focus and it is not limited to the boundaries of the borrow pit, but it encompasses the bigger picture and serve as the guiding tool to protecting the environment, bio-physical and socio-economic at large.

2.2 ENVIRONMENTAL MANAGEMENT ACT (NO.7 OF 2007)

The EMP should conform to the provisions of the Environmental Management Act (EMA), Act No. 7 of 2007 and EIA regulations of 2012 (Government Notice: 30). The EIA Regulations defines a '*Management Plan*' as:"*…a plan that describes how activities that may have significant environments effects on the environment are to be mitigated controlled and monitored.*"

2.3 EMP REQUIREMENTS

Table 2.1: EMP Requirements as outlined in Section 8 of the EIA Regulations

Requirement
(j) a draft management plan, which includes – *(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 the 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*

2.4 LISTED ACTIVITIES REQUIRING EIA AND EMP

The Environmental Management Act (Act No. 7 of 2007) and EIA Regulations of 2012 (Government Notice No: 30), highlights that listed activities may not be undertaken without an Environmental Clearance Certificate (ECC). The proposed townships trigger activities as listed in the table below:

Table 2.2: Listed activities triggered by sand and gravel mining activities

Activity	**Description of Activity**
Activity 3: Mining and quarrying Activities	*3.2 Other forms of mining or extraction of any natural resources whether regulated by law or not* *3.3 Resource extraction, manipulation, conservation and related activities*

The sourcing of construction material from the borrow site is classified as mining hence the triggered activity.

3. PROJECT INFORMATION

3.1 PROJECT LOCALITY

Oniipa town lies north east of Ondangwa town along B1 Omuthiya-Ondangwa Road and D3622 Onethindi-Eenhana Road. Sand and gravel mining operators have been extracting sand and gravel from the existing borrow pits. The two (2) borrow pits are located within the Oniipa Town council (ONPTC) boundaries. Sand mining pit is located on the eastern side of Oniipa town, approximately 2.5 km from the railway and Onethindi-Eenhana road crossing along the railway. The centre of the proposed site is at 17°55'47.8"S 16°03'23.2"E (https://goo.gl/maps/dWcf4f3NRhL2) see Figure 1 below.

Figure 1: Site location for Sand mining borrow pit

The gravel mining pit is located at the centre of Oniipa town, 500 meters south of B1 Ondangwa-Onethindi road. The site is surrounded by residential and business establishment where the council proposed establishment of townships are located. The centre of the proposed site is at 17°56'05.9"S 16°01'10.9"E (https://goo.gl/maps/cqS3ZkiYvMp) see figure 2 below.

Figure 2: Gravel mining borrow pit location

4 DESCRIPTION OF THE ENVIRONMENT

Oniipa Town Council (ONPTC) falls within the Cuvelai-Etosha Basin (CEB), a transboundary water basin that originates from the highlands (Cuvelai River) in Angola, and spreads across Namibia, resulting in shallow networks of channels locally known as "*oshanas*". In Namibia, the shallow network of channels merge and drain into the Etosha Pan known to be the lowest point of the basin. ONPTC is still a relatively new town, and subsistence farming activities (both crops and livestock) occur in the surroundings of the town.

4.1 CLIMATE

The Cuvelai Etosha basin atlas of 2013 provides detailed data and information on water and climate spatial implications. The area receives rainfall in summer between October-April with an annual mean rainfall of 350 mm/annum. The basin's upstream in southern Angola receives an average rainfall of 1,000 mm/ and decreases southwards to approximately 450 mm/a in Namibia, with rainfall amounts increasing from the south-west to the north-east of the basin. The sites have relatively higher levels of humidity ranging between 80-90% than much of the country.

4.2 SURFACE AND GROUND WATER SOURCES

The sand mining sites is adjacent to a small shallow channel network of the Cuvelai Basin locally known as "*oshanas*". The "Oshana" flows only during the rainy season usually when rainfall falls over the surround catchment and /or the whole catchment resulting in inundation. These sites are located within the Oshigambo system of the Cuvelai basin with no defined drainage patterns therefore floodwater from upper catchment rarely reaches the sites. However the sites are usually inundated by localized rainfall.

According to literatures, the mining sites lies on the Oshana multi-layered aquifer, which is characterized by Kalahari and Namib sand. The groundwater of the mining sites are of no usable quality except that shallow groundwater at the depth of 30m yield freshwater to the

hand dug wells which was utilized before the provision of purified portable water by Namibia Water Corporation (NamWater)

4.3 LAND USES – EXISTING BORROW PITS

- **Sand mining Borrow Pit**

  The sand mining pit is located within the Oniipa town lands. Over the past ten years, the site has been mined by several contractors with neither an environmental clearance certificate (ECC) from MET, nor authorization from the town council. Because the borrow pit falls within the jurisdiction of the Oniipa Town Council (ONPTC) townlands, the town council is trying to prevent further illegal mining activities and would like to limit the amount material (sand) by limiting the use to the needs for town development only. The land use in the surrounding area is mainly subsistence farming (both crops and livestock). Figure 3 shows the proximity of households that are within the 500m radius from the borrow site. The borrow pit already exists and further mining activities will not cause new damage to the environment. However, there is a need for ownership, control, monitoring, compliance and rehabilitation of the borrow bit, and hence the application by ONPTC to assume full control

Figure 3: Household within 500 m radius from the sand mining borrow pits

- **Gravel mining Borrow Pit**

  The gravel-mining site is also located within the Oniipa town lands and the site has been used as gravel bit long before the ONPTC was proclaimed. There are a number of urban developments on the outskirts of the gravel pit, but they are all located safe distances from the gravel pit (Figure 4).

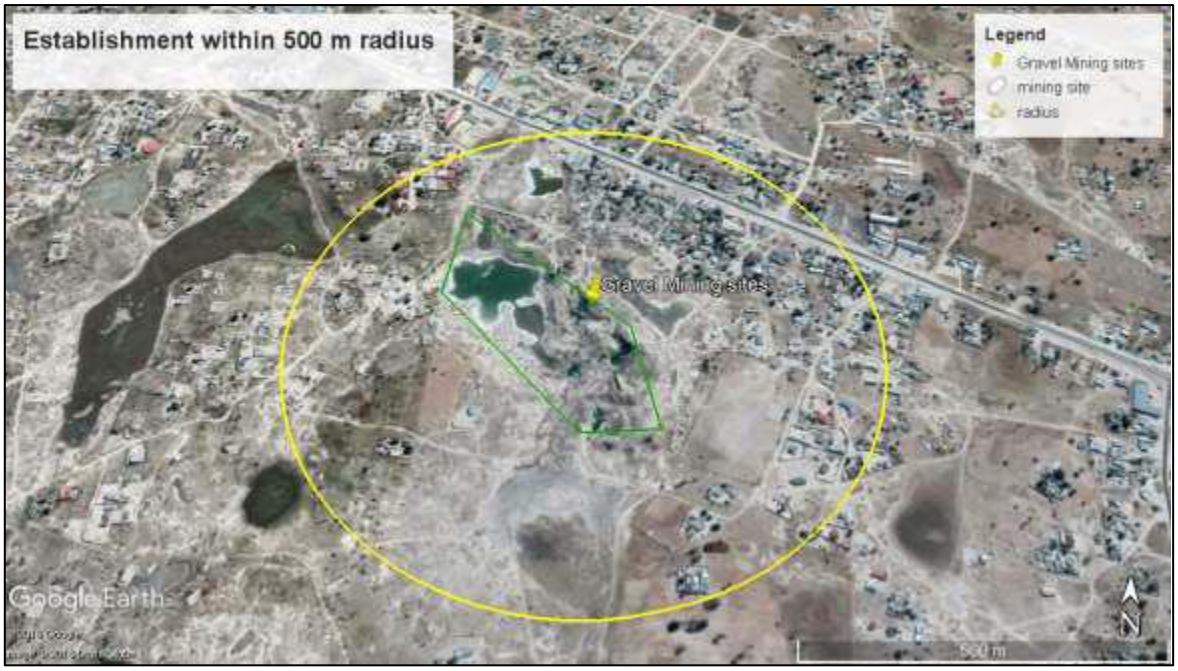

Figure 4: Establishment within 500m radius from the gravel mining borrow pits

4.4 ESTIMATION OF MATERIAL QUANTITIES

The total area earmarked for sand mining is estimated to be 3 hectares, of which only about 0.8 hectares is currently mined with an estimated volume of approximately 10 000 m3. It is estimated that 30,000m3 of sand is available for extraction. The pictures below in Table 4.1 shows the current situation at the sand mining borrow pits.

Table 4.1: Pictures of the current situation at the sand mining site

	
	

With regard to gravel, it is difficult to estimate the quantity of gravel extracted to date using remote sensing for number of factors;

- The top soil from the gravel pits is not used but piled in search of quality gravel for intended purpose, ii) Numerous borrow pits filled with water, and
- Difficult to estimate extraction depth. However, the estimated gravel borrow pits is approximately 8.36 hectares including the adjacent pan/depression. It is thus estimated that 30,000 m3 of gravel is extracted, and approximately 35,500 m3 is available for extraction. The complexity of the gravel mining borrow pits is here shown in pictures in Table 4.2 below

Table 4.2: Pictures depicting the current situation at the gravel mining site

5 ROLES AND RESPONSIBILITIES

Assigning responsibilities is necessary for accountability, and to ensure that the mitigation measures presented in the EMP are executed. The purpose of this section is to define the roles and responsibilities for key personnel and mandates to ensure the implementation of the EMP. The key role-players for project implementation are:

- The Environmental Compliance Officer (ECO) representing the MET for environmental auditing and monitoring;
- The Contractor (the proponent). The contractor could be the Oniipa Town Council (ONPTC) itself or the entity contracted or sub-contracted by the ONPTC to source the gravel material on its behalf (the person responsible should be appointed as the Borrow pit Manager and will be responsible for the implementation and adherence to the EMP).
- The Town Engineer (representative of Oniipa Town Council management and responsible to ensure that each / entity team enlisted by the ONPTC to work at borrow pit (including ONPTC staff members, contractors / sub-contractors) adheres to the EMP. The TE is liable and should maintain communication with the ECO as well as the I&AP's as guided by the communication strategy.
- The Site Manager (SM) or Site Foreman (SF), the person responsible for the day-to-day manage of the borrow pits. Could be an employee of the Oniipa Town Council (ONPTC) or the contractor. The SM / SF Should report to the town engineer on a daily basis.

5.1 THE ENVIRONMENTAL COMPLIANCE OFFICER (ECO)

The ECO in the context of this document refers to the party responsible for the environmental compliance and auditing activities required by the EMP for the lifecycle of the borrow pit activities. The ECO shall be a representative of MET or an equivalent independent environmental manager.
The ECO shall have adequate environmental knowledge to understand the detailed environmental issues associated with the project, and is to be well versed in the contents of the EMP and its associated reports:

- The ECO shall undertake all monitoring and auditing activities to ensure compliance with the EMP.
- The size and sensitivity of the development will determine the frequency at which the ECO will be required to conduct audits. For the sand and gravel mining activities, it is recommended that monthly site inspection be undertaken.
- The ECO shall inspect the borrow pits prior to commencement of sand or gravel mining activities, at least once (1) a month.
- The ECO shall compile Progress Reports following any site inspections (including progressive rehabilitation inspections), Compliance Reports following any non-compliances, and a Closure Report following the conclusion of mining and eventual closure of the site.
- The ECO shall liaise closely with the Borrow pit Manager and Town Engineer, and shall provide guidance on any environmental management issues, incidents or emergencies that are brought to their attention.

- The ECO shall assist in providing recommendations for remedial action in the event of any non-compliance.

5.2 THE CONTRACTOR – ONPTC

- ONPTC will be responsible for the overall operation of the borrow pit even if the sourcing of the material from the site gets assigned to a contractor / sub contractor. ONPTC shall be responsible for ensuring the day-to-day implementation of the EMP throughput the lifecycle of the sand and gravel mining activities. The following are responsibilities of ONPTC for overseeing the borrow pit.
- Appoint a Borrow pit Manager to oversee the daily onsite activities.
- Liaise closely with the Borrow pit Manager and the town engineer (TE) on any environmental management issues, incidents or emergencies.
- Ensure that all staff are adequately informed of the requirements of the EMP pertaining to their site role, and that they have attended an environmental induction session (this session must be in the form of an on-site talk and/or a written code of conduct that is clearly explained to and understood by the team).

5.3 TOWN ENGINEER (TE)

The Site Foreman (SF) is a representative of ONPTC, responsible for the overall management of the site or the contractor contacted by the council and should report to the council on a daily basis. The SM shall have the following duties:

- Responsible for overseeing the overall activities associated with the excavation of the borrow pit, including the site operational phase, the rehabilitation and closure phase of the site.
- Has the mandate to issue site instructions, following request by an ECO or instructions from the BM.

5.4 SITE MANAGER (SM)

- Ensure that the sand and gravel mining operations are conducted in an environmentally sensitive manner and in accordance with the requirements of the EMP at all times. Special care shall be taken to prevent irreversible damage to the environment.
- Ensure that sand and gravel mining activities are confined within the boundaries of the exising borrow pits.
- Ensure that any subcontractors or visitors to the site are conversant with the EMP or relevant sections of the EMP pertaining to their role on-site.
- Ensure that the site is rehabilitated in accordance within the requirements of this EMP.

5.5 GENERAL GUIDELINES

The following measures provide guideline solutions to frequently projected issues on most development activities:

- The project site must be clearly defined, and all sand and gravel mining operations should not go beyond the defined site.
- The site staff must adhere to agreed and approved access roads
- Damage to private or public property such as fences, gates and other infrastructure may occur at any time, damages should be repaired immediately and to the satisfaction of the owner.
- Ensure proper site management and regular monitoring of site works.
- Ensure proper documentation and record keeping of all complaints and actions taken.
- Environmental audits should be conducted throughout the project lifespan

5.6 ENVIRONMENTAL AWARENESS AND TRAINING

The Project Manager and the ECO are responsible for ensuring that all project personnel on site are given an environmental awareness induction course. The induction should outline the requirement of the EMP as the management tool to protect the environment. Refresher training must be conducted as necessary.

5.7 COMPLIANCE WITH REQUIREMENTS

Environmental management is not only concerned with the final results of the Contractor's operations to carry out works, but also with how such operations are carried out. Tolerance with respect to environmental matters applies not only to the finished product but also to the standard of the day-to-day operations required to complete works.

The EMP is essential in mitigating the identified social and environmental risks, however, in the absence of auditing, monitoring and compliance, the EMP will be ineffective. Auditing and monitoring activities involve the structured observation, measurement, and evaluation of environmental data over a period of time.

The overall responsibility to ensure that the EMP is implemented rests with the Oniipa Town Council, who shall appoint a competent engineer and contracting teams (internal = council staff or external = sub-contractors) to undertake work. The ECO shall inspect the site at regular intervals and shall report on the level of compliance with this EMP to ONPTC, MET and any other relevant Authority.

5.8 DISCIPLINARY ACTION

The EMP is a legally binding document. Non-compliance with the EMP shall result in disciplinary action being taken against the perpetrator/s. Such action may take the form of (but is not limited to) financial penalties, legal action, fines and/or suspension of work.

The Oniipa Town Council shall be deemed to have **not** complied with the EMP if:

- There is evidence of contravention of the EMP;
- ONPTC fails to comply with corrective or other instructions issued by the ECO or MET within a specified time.
- ONPTC fails to respond adequately to complaints from the public.

The disciplinary action shall be determined according to the nature of the noncompliance or crime, and exact penalties are to the discretion of MET according to the severity of the incident.

5.9 COMMUNICATION STRATEGY

It is further recommended that an organisational structure be developed to ensure that:

- There are clear channels of communication;
- There is a communication structure and hierachy to implement the project;
- Potential conflicting or contradictory instructions are avoided

All instructions and official communications relating to the EMP shall follow the communication structure as determined by the Oniipa Town Council (ONPTC). The only exception to this rule would be in an emergency (defined as a situation requiring immediate action and where failure to intervene timeously would, in the reasonable opinion of the Town Engineer (TE), or equivalent, result in unacceptable environmental degradation), where instructions may be given directly to the Borrow pit Manager or any other person contracted to work at the borrow pit.

Whatever communication structure is adopted by ONPTC, it is essential that the responsibilities outlined are assigned to specific parties with the capacity and experience required to implement the EMP.

6 MITIGATION MEASURES

This section outlines the mitigation measures to be implemented throughout the lifespan of sand and gravel mining activities, to ensure compliance to the EMP and most importantly to ensure social and environmental protection.
The table below outlines mitigation measures to be implemented for the sand and gravel mining operation

Table 6.1: Staff Induction

Aspect	Objective	Proposes Mitigation Measures	Monitoring Indicator	Party responsible
Staff induction	To ensure that all staff / employees are conversant with the requirements of the EMP	• Induction for all staff / employees on the provisions of the EMP before work commencement, covering but not limited to: environmental awareness, emergency response, Reporting of incidents, HIV/AIDS awareness, alcohol and substance abuse, and Safety, Health and Environment (SHE) measures • Staff operating equipment (such as loaders, etc.) shall be adequately trained and sensitized to any potential hazards associated with their tasks • Quarterly induction reviews	Induction Minutes and Attendance Register, Signed by each and every staff member Staff members appointed at a later stage should also undergo induction Quarterly minutes	Site Manager
	Punitive measures for staff, to ensure compliance	• Adopt a disciplinary system to discipline staff for non-compliance, such as littering, speeding, safety risk both to themselves and to others, not using ablution facilities, etc.	Number of fines/warning issued daily/Monthly	Site Manager
	Availability of the EMP on site for ease of reference	• Ensure that a copy of the EMP is kept on site and accessible to team leaders	Availability of EMP on site and accessibility to team leaders	Site Manager
Communi -cation	To ensure effective communication throughout the project lifespan	• Develop a communication strategy (Chanel and medium of communication) • All correspondence should be written and signed off by witnesses (e.g. Site manager) • The contact numbers for the Site Manager or Site Foreman must be available onsite (displayed) in case of emergencies.	Communication Strategy Letters, e-mail, Notices, Minutes	Site Manager

Table 6.2: Operational Aspects

Aspect	Objective	Action Required	Monitoring Indicator	Party responsible
Access Roads	Prevent driving all over the place	• Establish access routes to the mining and stick to existing roads as far as possible • New roads may only be established if extremely necessary • Access roads should be repaired and maintained at acceptable standards		Site Manager
Site Demarcation	Contain all project activities within the site boundaries	• The mining area must be clearly demarcated by means of pegs/markers at all corners of the site and along its boundaries (where practical). • Permanent pegs/markers must be firmly erected and maintained in their correct position throughout the life of the operation. • The mining site must be fenced off to prevent public access to the sites for public safety	Visible fence around the project site	Site Manager
General Notice Board	To notify and warn the public of the project activities	• A general notice board must be erected at the site entrance to notify the public of the sand and gravel mining activities	Notice Board – Visible and Clear	Site Manager

Table 6.3: Environmental and Pollution Aspects

Aspect	Objective	Action Required	Monitoring Indicator	Party responsible
Vehicle emissions	Reduce greenhouse gas (GHG) emissions from poorly maintained or malfunctioning equipment (vehicles / machinery	• All vehicles and equipment shall be kept in good working condition and serviced regularly (in accordance with the servicing frequency of the specific machinery), in order to prevent leakage and emission of poisonous smoke etc. • Switch off engines when vehicle is not operations	Vehicle servicing records Reports of smoke emissions from machinery	Site Manager
Oil Spils	Manage oil spills and leak from heavy vehicles and Machinery	• Provide drip trays to prevent potential oil leakage • Re-fuelling of machinery (e.g excavator) must be done at appropriate site with impermeable bund	Observation of soil contamination	Site Manager
Soil Erosion	To mitigate soil erosion	• Only use the existing gravel road to and from the site, do not form other tracks • Implement continuous rehabilitation measures, by trimming and smoothing the slopes to be less than one third of the initial slope (1:3). This would allow easy access to the pit by people and animals, as well as allows for smooth runoff of storm water and prevent formation of gullies.	Physical Observation	Site Manager

Table 6.4: Health and Safety

Aspect	Objective	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
General Safety at Work Place	Ensure that the safety of workers is not compromised and adhere to the Health and Safety Regulations, Government Notice 156/1997 (GG 1617)	• Develop a Health and safety Plan (should be part of the induction) • Ensure that every employee goes through a safety induction; • Employees must be equipped with all necessary Personal Protective Equipment (PPE). These includes, Helmet, Overall, Safety Shoes, Safety Glasses, Gloves, Welding shield, Earmuff etc; • Provide first aid kits to operators; • Only qualified personnel must be allowed to operate special machinery (e.g earthmoving machinery) • Adequate safety signs must be displayed on site. • Fence off the borrow pits	Health and Safety included and reflected in the Induction Minutes Adequate protective gear for all staff Availability of the first aid kit onsite Number of warning/discipline Visible safety signs on site	Site Manager
Ablution facilities and other Health aspects	Reduce health risks and environmental pollution and ensure healthy working environment with appropriate and user friendly ablution facilities	• Provide user-friendly ablution facilities, with separate Male and female toilets at a ratio of 1:15 for females and 1:30 for males; • Employ a cleaner or rotate cleaning responsibilities amongst workers to ensure hygiene; • Inspect ablution facilities regularly for cleanliness; • Provide dust bins for solid waste disposal;	availability, cleanliness and hygienic ablution facilities Incidents or complaints of waste discharge into the environment	Site Manager

Aspect	Objective	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
		• No defecation should be tolerated in any place other than the toilets provided		
Dust	Mitigate dust and noise impacts to both employees and the public	• Use dust suppression measures to mitigate dust impacts, e.g Investigate the potential use of 'grey' water, or use alternative method such as DUSTEX, etc • Avoid working during extreme windy conditions • Provide dust masks and ear muffs to all employees operating in a dusty or noisy environment • Reduce vehicle speed on gravel roads • All vehicles transporting sand or gravel should be covered with a tarpaulin, or any other suitable material, and, • Industrial speed limits must be maintained	Incident Report Public Complains	Site Manager
Noise		• Employees must NOT be exposed to noise levels above the required -85dB (A) limit over a period of 8 hours. Should the noise level be higher than 85dB (A), the employer must implement a hearing conservation program such as noise monitoring; • Where possible, install silencer in exhaust to reduce noise levels • Only work during normal working hours, do not		

Aspect	Objective	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
		work during the night • Provide worker with earmuffs • Vehicle engines must be shut down when it is not in use • Vehicles and machines must be well serviced to avoid unnecessary noise emission • Limit the movement of earth moving machinery and heavy vehicles (tipper trucks) to daylight: 06:00AM – 18:00 PM		
Fire Risk	To mitigate fire risk	• Staff must be properly trained on how to react and respond to fire • Firefighting equipment must be on site 24 hours and regularly inspected to ensure that they are functional • Emergency response numbers should be displayed on site	Fire incident reports	Site Manager

Table 6.5: Socio Economic Aspects

Environmental / Social Impact	Objectives	Proposed Mitigation Measures	Monitoring Indicator	Party Responsible
Employment opportunities for Locals	Promote benefits to the local community	• Recruit locals for unskilled labour • Where possible, procure materials from local suppliers	Employee structure and proportion of local employment	ONPTC
Alcohol and Drug use	Prevent alcohol and drug use at work	• Ban and warn the employees against the use of alcohol and drug at work • Provide awareness on the dangers and health impacts of alcohol and drug use	Drunk / Misbehaving employees Monitor presence of alcohol at work	Site Manager
Working hours	Adhere to the Labour Act No. 11 of 2007	• Operate within the prescribed working days and hours as per the Namibian Labour laws and regulations	Verification of working hours against the labour Act	Site Manager
HIV / AIDS	Provide HIV / AIDS awareness to employees	• The Ministry of Health and Social Services provides free condoms to all public amenities and health care centers. • The ONPTC should arrange for HIV awareness for employees;	Availability of condoms at work Minutes for induction course	ONPTC_TE
Security	Orientation of workers about security for both equipment and themselves	• Orientate all staff about the security of equipment and themselves & provide contact numbers for emergency services e.g. Ambulance and Police.	Proof of security orientation and emergency contact numbers	Site Manager

Table 6.6: Cultural and Heritage

Aspect	Objective	Action Required	Monitoring Indicator	Party responsible
Heritage Resources / artefacts	Reduce the impacts of construction and associated earthworks on heritage resources / artefacts	1. Heritage remains or artefacts discovered on site must be reported to the National Museum (+264 61 276800) or the National Forensic Laboratory (+264 61 240461). 2. No artefacts must be removed or be interfered with prior to authorisation from the Namibian National Heritage Council (NHC) 3. Recovery of heritage remains or artefacts discovered and removal thereof should be directed by the National Museum	Sighting report/s of heritage resources / artefacts	Site Manager

7 REHABILITATION

Rehabilitation is the process of repairing and taking all necessary actions to limit the damage caused by the developmental activity, to minimise potential danger, to make the land suitable for other uses or simply to beautify the affected area (so that it does not become an eyesore). Rehabilitation can also be referred to as the measures taken to repair damaged environments (example refilling of borrow pits with the overburden, re-vegetating, removal of unwanted infrastructure, cleaning up pollution etc).

In principle, an open pit poses safety and environmental risk. People and animals may fall in during night, or drown when the pit is filled with water. Therefore, it is crucial to develop a closure and rehabilitation plan for the borrow pits. It is recommended that progressing / incremental rehabilitation should be implemented right from the beginning of the mining activities, and should be carried out throughout the project lifespan.

Overall, the aim of the rehabilitation plan is to ensure soil conservation, prevent soil erosion, reduce safety risk (safety for both animals and people, particularly children) and to ensure that the borrow pits do not become eye shores to the public.

7.1 DESIGNING A REHABILITATION PLAN

A rehabilitation plan refers to a set of steps or measures to be taken in-order to ensure that negative impacts associated with the development at hand are mitigated. This however requires prior planning and integration of rehabilitation activities throughout the project lifespan. Meaning, rehabilitation measures should be taken right from the beginning of the project.

The environmental characteristics of an area where a project is located plays a vital role in designing a rehabilitation plan.

7.2 RECOMMENDED MEASURES

The rehabilitation plan should encompass the following:

a) **Inform relevant authorities and obtain relevant permissions for the project closure**

b) **Staff awareness of the closure plan**
   - Staff must be trained and made aware of the closure and rehabilitation and their roles during implementation.

c) **Fencing**
   - To prevent accident and protect public safety, the mining area must be fenced off, and any pit that is not fully rehabilitated.

d) **Site Clean up**
   - Contaminated soils and any material brought to the area must be collected and be disposed of at an appropriate site. Burying of waste or any foreign material is strictly prohibited.

e) **Trimming and Smoothening of the pit**

- To ensure safety and prevention of soil erosion from the sharp angels of the pit; The pit contours must be even and slopes smoothened and not steeper than 1:3. Formation of a cut-off drain to enable permanent drainage and to ensure smooth run-off. A deliberate natural structure must be designed from the catchment area to guide storm water into the pit.

f) Top Soil / Overburden

- This soil contains seeds and it is fertile for re-vegetation. Therefore, the topsoil should be used for smoothening of sharp angles and re-filling to allow re-vegetation.

g) Compaction of disturbed surrounding

- The compacted soil must be shallowly ripped and fertilized to allow regrowth of vegetation.

h) Access roads

- Access road made for this operation and would be no longer serve any purpose after project closure, should be rehabilitated by ripping the road surface to allow regrowth of vegetation.

i) Safety

- After trimming of sharp slopes, the pit would not be completely covered. Therefore, it still pose a risk of drowning to animals and people. Hence, due diligence should be applied to determine before the removal of the fence, to ensure safety.

8 CONCLUSION

Socio-economic development is very important for our livelihood and provides services, income, and employment opportunities, and hence activities such as sand mining are vital and necessary for development. However, such developmental activities should be conducted in a thoughtful and forward-looking manner. In other words, developmental activities, such as sand mining should consider the future land use after such activity has come to an end. Therefore, to ensure that the land remains valuable for other land uses in the future, rehabilitation should be part and parcel of such developmental activity right from the beginning and throughout the project lifespan.

The scope of this project followed the TORs that were established through site visit, and literature review to establish all possible environmental impacts and the possible mitigation measure to the impacts concerning this project.

9 RECOMMENDATIONS

Winplan believes that, the EMP adequately addresses all environmental and socio-economic aspects for the continuation of the sand and gravel mining activities. The sand and gravel mining activities are crucial for the township development and socio-economic development for the Oniipa Town and its inhabitants in general.

Provided that the proposed mitigation measures against social and environmental threats are adequately implemented, the potential environmental and social impacts are negligible (insignificant).

Given the above, TEC strongly recommend the approval and issuance of environmental clearance certificate for existing sand and gravel mining activities in the Oniipa Town Council (ONPTC). As stated under point 1.5 (P2), the EMP is a living document and if necessary, new mitigation measures can be added.