


APP-00

Title	ENVIRONMENTAL IMPACT MITIGATION AND MANAGEMENT PLAN FOR THE PROPOSED ESTABLISHMENT AND OPERATION OF A BORROW PIT AT ONASHIKU SHALABAN, OKATANA CONSTITUENCY, OSHANA REGION, NAMIBIA		
HEEC Reference	06/2022		
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ABBREVIATIONS

AIDS	Acquired Immuno-Deficiency Syndrome
PR	Proponent's Representative
EA	Environmental Assessment
ECC	Environmental Clearance Certificate
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental Management Plan
GG	Government Gazette
GIS	Geographic Information System
GN	Government Notice
GPS	Global Positioning System
HEEC	Healthy Earth Environmental Consultants
HIV	Human Immuno-deficiency Virus
I&APs	Interested and Affected Parties
MMP	Management and Mitigation Plan
NHC	National Heritage Council
Reg.	Regulation
UTA	Uukwambi Traditional Authority
S	Section
TB	Tuberculosis

1. INTRODUCTION

1.1 General Introduction

Uukwambi Traditional Authority, hereinafter referred to as the proponent, is in the process of establishing and operating a borrow pit for the purpose of obtaining construction material in terms of sand. The borrow pit will be situated at Onashiku shaLaban village, which is located approximately 7 Km west of Oshakati and 3 Km west of the C46 main road stretching from Oshakati to Oshikuku within the the Okatana constituency in Oshana Region. The aim of the intended project is to establish and operate a borrow pit to supply raw materials for construction activities such as the housing projects in Oshakati and surrounding towns, in particular the new extension at Ekuku, located at Okatana within the townlands of Oshakati in the Oshana Region and ensure that environmental considerations are taken into account in their business ventures. The proponent has in the interim secured offtake agreements with some of the property developers for housing development at the new extension at Ekuku, which will consist of mixed housing development for both low- and middle-income categories. The proponent has through extensive market research determined that Oshakati and the surrounding townships are experiencing shortages of raw materials in terms of sand; this has resulted in project implementation delays due to limited supplies of raw materials. The demand for sand in Oshakati and surrounding towns has been prompted by high demand of houses and an increase in housing development and other civil infrastructural development. The proposed project will have a cumulative economic impact to the village and surrounding towns; the project will be operated as a community project and the recruitment of all employees will be handled by the traditional authority largely managed by the community members from Onashiku shaLaban Village. The lifespan of the project is expected to be 10 years and thereafter the borrow pit will be converted into an earth dam to harvest water to be used at the adjacent community vegetable garden and an aquaculture project will be considered in the future. The project will have a significant economic impact at the village. A community hall will be constructed, and a community garden project has already been established to further create more job opportunity at the village. The sand will be excavated in the borrow pit using a bulldozer and front-end loader machine to fill the tipper trucks. The raw materials will then be transported to different construction sites within the townlands of Oshakati and beyond using tipper trucks with bucket covered with plastic nets.

The bulk product of sand will be transported to the clients for use in construction of housing and national road projects in the northern regions, civil construction, and brick making projects predominantly in Oshana region. In short Uukwambi Traditional Authority (UTA) will be:

- a) Mining
- b) Heap pilling
- c) Loading
- d) And transporting sand.

In an effort to ease costs and promotion of the manufacturing of construction materials locally, sand mining has gained impetus in Namibia over the past years. However, illegal sand mining has resulted in negative environmental consequences in the respective areas. This has been largely attributed to the fact that people were under no commitment to rehabilitate the affected areas and hence left behind large open borrow pits which present a danger to both humans and animals. Hence improved efforts for borrow pit rehabilitation must be carried out and the premeditated conversion of the borrow pit into an Earth-Dam project in the area can significantly contribute to water retention to guarantee water availability for the community and livestock during the dry weather season.

Uukwambi Traditional Authority (UTA) proposes to carry out the following activities:

- **Environmental Impact Mitigation and Management Plan for the proposed establishment and operation of a borrow pit at Onashiku shaLaban village, Okatana Constituency, Oshana Region.**

The essence of the proposed activity entails formulating the environmental management plan (EMP) which is mandatory to assess the potential environmental, social and economic impacts associated with the operation of the borrow pit at Onashiku shaLaban village, Oshana Region and further formulate mitigation measures of the borrow pit that will be established through the excavation of the topsoil that will be collected.

The above is a listed activity in terms of the Environmental Management Act (No. 7 of 2007) and Environmental Impact Assessment Regulations (Government Notice No. 30 of 2012).

In terms of the Environmental Management Act (No. 7 of 2007) and Environmental Impact Assessment Regulations (Government Notice No. 30 of 2012), the following listed activities in **Table 1** were triggered by the proposed project:

Table 1: List of prompted activities identified in the Environmental Assessment Regulations which apply to the proposed project

Activity description and No(s):	Description of relevant Activity	The portion of the development as per the project description that relates to the applicable listed activity
Activity 3.1 (Mining and Quarrying Activities)	The construction of facilities for any process or activities which requires a licence, right or other form of authorisation, and the renewal of a licence, right or other form of authorisation, in terms of the Minerals (Prospecting and Mining Act), 1992.	The proposed project entails the harvesting of sand for construction purposes.
Activity 3.2 (Mining and Quarrying Activities)	Other forms of mining or extraction of any natural resources whether regulated by law or not.	The proposed project entails the extraction of sand for construction purposes.
Activity 3.3 (Mining and Quarrying Activities)	Resource extraction, manipulation, conservation and related activities.	The planned project includes the extraction of sand for construction purposes.

An Environmental Management Plan (EMP) is one of the most crucial outputs of the Environmental Assessment process as it fuses all the proposed mitigation and monitoring performance, laid down to a specified time and with detailed assigned responsibilities. This EMP provides mitigation and monitoring techniques to be put into practice during the following phases of this project:

- Sand Mining Phase – the period during which the proponent, having dealt with the necessary legislative and administrative arrangements, appoints a contractor to take on the harvesting of sand from the borrow pit site to be used for construction purposes.
- Earth-Dam Construction Phase – the period during which the open borrow pit at Onashiku shaLaban village will be converted into a perimeter-fenced earth-dam for the purposes of water retention.

The rehabilitation of the surrounding sand mining area and conversion of the borrow pit into an earth-dam as soon as the activities have been decommissioned is highly recommended so as to ensure that the subject area assumes its newly assigned ecological functions, as it will now be an earth-dam feature and not become a drowning hazard to the livestock and locals making use of this water post the sand mining phase; whenever the event occurs then some recommendations have been outlined in **Table 7**.

In accordance with the provisions of the Environmental Impact Assessment (EIA) Regulations No. 30 of 2012 gazetted under the Environmental Management Act, (EMA), 2007, (Act No. 7 of 2007), the sand mining activities (sand mining, processing, and transportation) proposed by Uukwambi Traditional Authority is a Listed Activity and may not be undertaken without an Environmental Clearance Certificate (see **Table 2**).

Table 2: List of activities identified in the EIA Regulations which apply to sand mining activities in Namibia

EMA 2007 Legislation	Description of activity	Relevance to Uukwambi Traditional Authority Sand mining project
Activity 4 (Forestry activities)	The clearance of forest areas, deforestation, afforestation, timber harvesting or any other related activity that requires authorisation in terms of the Forest Act, 2001 (Act No. 12 of 2001) or any other law.	The envisaged project includes clearing few individual trees and shrubs to access sand and makes it accessible for excavation purposes.
Activity 3.1 (Mining and Quarrying Activities)	The construction of facilities for any process or activities which requires a licence, right or other form of authorisation, and the renewal of a licence, right or other form of authorisation, in terms of the Minerals (Prospecting and Mining Act), 1992.	The proposed project includes the harvesting of sand for construction purposes.
Activity 3.3 (Mining and Quarrying Activities)	Resource extraction, manipulation, conservation, and related activities.	The proposed project includes the extraction of sand for construction purposes.

This (EMP) is a site-specific management and mitigation plan (MMP) formulated to meet legal requirements and minimise the impacts associated with the sand mining operation at a borrow pit

belonging to Uukwambi Traditional Authority at Onashiku shaLaban village, Okatana constituency, Oshana Region.

The Management and Mitigation Plan (MMP) has been compiled based on a review of the findings and recommendations of the site visit carried out on the 3rd June 2022.

1.2 Keeping EMPs up to date

This Environmental Management Plan (EMP) should be seen as a “living document” which will be updated during the sand mining operation, as the activities might change or new parameters be presented.

Should a listed activity(s) as defined in the Environmental Impact Assessment Regulations: Environmental Management Act, 2007 (Government Gazette No. 4878) be initiated (as a result of future alterations/modifications at the borrow pit site), this EMP will be updated accordingly as postulated in the regulations.

2. ENVIRONMENTAL LAWS AND POLICIES

This section draws information from the legal sources in Namibia. The Republic of Namibia has five tiers of law and a number of policies relevant to sand mining activities and these include:

- The Constitution.
- Statutory Law.
- Common Law.
- Customary Law.
- International Law.

Key Acts and policies currently in force include:

- Namibia’s Environmental Assessment (EIA) Policy for Sustainable Development and Environmental Conservation (1995);
- Environmental Management Act (No. 7 of 2007);
- Environmental Impact Assessment Regulations (Government Notice No. 30 of 2012);
- Namibia Agriculture Policy of 2015;
- Namibia Vision 2030;
- National Solid Waste Management Strategy

As the core source of legislation, the Namibian constitution makes provision for the creation

and enforcement of applicable legislation. In this context and in accordance with its constitution, Namibia has passed numerous laws intended to safeguard the natural environment and to mitigate adverse environmental consequences.

Namibia's policies render the framework to the applicable legislation. Whilst policies do not often carry the same legal recognition as official statutes, policies can be and are used in providing support to legal interpretation when deciding cases. Moreover, the following (**Table 3**) entails the permits that will be required in order for the proponent to be compliant with the law:

Table 3: List of all the applicable permits/authorizations required by Uukwambi Traditional Authority

Aspect	Permits/Certificates/Authorizations	Regulator
Construction materials - sand	Environmental Clearance Certificate for establishment and operations	MEFT
Waste	Wastewater and effluent Disposal exemption permit	MAWLR
Vegetation	Forest Permit –Tree Harvesting - Protected Trees	MEFT - DF

3. ROLES AND RESPONSIBILITIES

The proponent (Uukwambi Traditional Authority) is in due course responsible for the execution of the EMP, from the sand mining phase until the construction phase of the Earth-Dam at Onashiku shaLaban village. The proponent will entrust this responsibility as the project progress through its life cycle. The entrusted accountability for the successful execution of this EMP will be the responsibilities of the following key persons:

- Proponent's Representative;
- Environmental Control Officer; and
- Contractor (sand mining; borrow pit rehabilitation and earth-dam construction).

3.1 PROPONENT'S REPRESENTATIVE

Uukwambi Traditional Authority (UTA), the proponent, should assign the responsibility of overseeing all aspects of this development for all developmental phases (including all contracts for work outsourced) to a designated member of staff, referred to in this EMP as the Proponent's Representative (PR). The proponent may decide to assign this responsibility to one person for the entire duration of these developments or may allot a different PR to each of the development phases – i.e., one for the sand mining, one for the borrow pit rehabilitation and, one for the conversion phase of the borrow pit into an Earth-Dam. The PR's responsibilities are as follows:

Table 4: The summary of the responsibility of the PR during sand mining project phase

Responsibility	Project Phase
Ensure that the required approvals and permissions laid out in Table 3 are acquired and complied to	Entire lifecycle of this project
Suspending/evicting individuals and/or equipment not complying with the EMP	<ul style="list-style-type: none"> • Sand mining • Borrow pit rehabilitation • Earth-Dam construction phase
Issuing fines for contravening EMP requirements	<ul style="list-style-type: none"> • Sand mining • Borrow pit rehabilitation • Earth-dam construction phase

3.2 ENVIRONMENTAL CONTROL OFFICER

The PR should allot the responsibility of managing the execution of the entire EMP on the ground during the sand mining; borrow pit rehabilitation and Earth-Dam construction phases to a designated member of staff, referred to in this EMP as the Environmental Control Officer (ECO). The PR/ Uukwambi Traditional Authority may decide to assign this responsibility to one person for all three activities, or may assign a different ECO for each activity. The ECO will have the following tasks during the construction and operation and maintenance phases of these developments:

- Supervising and coordinating the communication between the Proponent, PR, the contractors, and Interested and Affected Parties (I&APs) with regard to this EMP;
- Conduct habitual inspections (recommended minimum frequency is once every six months) with respect to the execution of this EMP (monitor and audit the execution of the EMP);

- Render support to the contractor in determining clarifications with respect to matters pertaining to the execution of this EMP.
- Advise the PR on the removal of person(s) and/or equipment not complying with the provisions of this EMP;
- Recommend to the PR with respect to the issuing of fines for contraventions of the EMP; and
- Conduct review of the EMP once a year and make changes where it is appropriate and/or improve this document.

4. SAND MINING; BORROW PIT REHABILITATION AND CONVERSION OF THE BORROW PIT INTO AN EARTH-DAM POND

4.1 CONTRACTOR

A contractor, in this case being the proponent (Uukwambi Traditional Authority) undertakes the sand mining activities; borrow pit rehabilitation and conversion of the borrow pit to an Earth-Dam at Onashiku shaLaban village and is therefore liable for executing all provisions entailed in this EMP. The proponent will be in charge of the sand mining activities; borrow pit rehabilitation and will be responsible for the implementation of this EMP applicable to all works outsourced to subcontractors. **Table 3** applies to the permit required during the sand mining phase and **Table 4** to those appointed during the conversion of the borrow pit to an Earth-Dam pond phase. In order to guarantee operative environmental management, the above-mentioned information should be integral in the execution of the EMP by the contracts for all sub-contracted activities.

5. MANAGEMENT ACTIONS

The core of the management arrangements in this EMP is to mitigate the possible impacts related with this project where possible. In cases where impacts cannot be mitigated, appropriate measures are provided to reduce the significance of these impacts.

The following tables outline the management actions suggested to reduce the potential impacts for these activities. These management actions have been formulated according to each of the project phases:

- Applicable legislation (**Table 5**);
- Sand mining & borrow pit rehabilitation Management Actions (**Table 8**);
- Conversion of the borrow pit into an Earth-Dam (**Table 9**); and

- Decommissioning phase - Management Action (**Table 10**).

NB: The responsible persons from the proponents' team have evaluated these commitments in detail and have committed to the specific management actions indicated in the tables below.

6. ASSUMPTIONS AND LIMITATIONS

This EMP has been formulated based on the information acquired during the site visit on 03 June 2022 for the operation and management of the sand mining activities; borrow pit rehabilitation and conversion of the borrow pit into an Earth-Dam. HEEC will not be held accountable for the consequences that may emanate from any alterations to the outlined course of action in terms of the proposed sand mining activities at Onashiku shaLaban village.

It is presumed that labourers will be sourced mostly from the Onashiku shaLaban village and that migrant labourers (if applicable) will be housed within established accommodation facilities close to Onashiku shaLaban villag.

7. APPLICABLE LEGISLATION

There are innumerable legal tools that control and have a manner on good environmental management in Namibia. **Table 5** below provides a summary of the legal tools considered to be important to the sand mining; borrow pit rehabilitation and conversion of the borrow bit into an Earth-Dam activity and the environmental assessment process.

Table 5: Legal provisions relevant to these activities

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
<p>The Constitution of the Republic of Namibia as Amended</p>	<p>Article 91 (c) provides for duty to guard against “the degradation and destruction of ecosystems and failure to protect the beauty and character of Namibia.”</p> <p>Article 95(l) deals with the “maintenance of ecosystems, essential ecological processes and biological diversity” and sustainable use of the country’s natural resources.</p>	<p>Sustainable development should be at the forefront of management of the proposed sand mining activities.</p>
<p>Environmental Management Act No. 7 of 2007 (EMA)</p>	<p>Section 2 outlines the objective of the Act and the means to attain that.</p> <p>Section 3 details the principles of Environmental Management</p>	<p>The management of this project must be informed by the EMA.</p>
<p>EIA Regulations GN 28, 29, and 30 of EMA (2012)</p>	<p>GN 29 Identifies and lists certain activities that cannot be undertaken without an environmental clearance certificate.</p> <p>GN 30 provides the regulations governing the environmental assessment (EA) process.</p>	<p>Activity 3.1 (Mining and Quarrying Activities) The construction of facilities for any process or activities which requires a licence, right or other form of authorisation, and the renewal of a licence, right or other form of authorisation, in terms of the Minerals (Prospecting and Mining Act), 1992.</p> <p>Activity 3.2 (Mining and Quarrying Activities) Other forms of mining or extraction of any natural resources whether regulated by law or not.</p> <p>Activity 3.3 (Mining and Quarrying Activities) Resource extraction,</p>

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
		manipulation, conservation and related activities.
Convention on Biological Diversity (1992)	Article 1 lists the conservation of biological diversity amongst the objectives of the convention.	The sand mining; borrow pit rehabilitation and conversion of the borrow pit into an Earth-Dam should consider the impact it will have on the biodiversity of the area.
Draft Procedures and Guidelines for conducting EIAs and compiling EMPs (2008)	Part 1, Stage 8 of the guidelines states that if a proposal is likely to affect people, certain guidelines should be considered by the proponent in the scoping process.	The EMP should incorporate the aspects outlined in the guidelines.
Namibia Vision 2030	Vision 2030 states that the solitude, silence and natural beauty that many areas in Namibia provide are becoming sought after commodities and must be regarded as valuable natural assets.	Care should be taken that sand mining; borrow pit rehabilitation and conversion of the borrow pit into an Earth-Dam do not lead to the degradation of the natural beauty of Onashiku shaLaban village.
Water Act No. 54 of 1956	Section 23(1) deals with the prohibition of pollution of underground and surface water bodies.	The pollution of water resources should be avoided during sand mining; borrow pit rehabilitation and conversion of the borrow pit into an Earth-Dam.
The Ministry of Environment and Tourism (MEFT) Policy on HIV & AIDS	MEFT has recently developed a policy on HIV and AIDS. In addition, it has also initiated a programme aimed at mainstreaming HIV and gender issues into environmental impact assessments.	The proponent and contractor have to adhere to the guidelines provided to manage the aspects of HIV/AIDS. Experience with similar projects has shown that a significant health risk can transpire when migrant workers/labourers interact with local communities.
Local Authorities Act No. 23 of 1992	The Local Authorities Act prescribes the manner in which a town or municipality should be managed by the Town or Municipal Council. Sections 34-47 make	On-going sand mining; borrow pit rehabilitation and conversion of the borrow pit into an Earth-Dam have to comply with provisions of the Local Authorities Act.

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
	provision for the aspects of water and sewerage.	
Labour Act No. 11 of 2007	Chapter 2 details the fundamental rights and protections. Chapter 3 deals with the basic conditions of employment.	Given the employment opportunities presented by the sand mining; borrow pit rehabilitation and conversion of the borrow pit into Earth-Dam, compliance with the law is essential.
Public and Environmental Health Act of 2015	This Act (GG 5740) provides a framework for a structured uniform public and environmental health system in Namibia. It covers notification, prevention and control of diseases and sexually-transmitted infections; maternal, ante-natal and neo-natal care; water and food supplies; infant nutrition; waste management; health nuisances; public and environmental health planning and reporting. It repeals the Public Health Act 36 of 1919 (SA GG 979).	The sand mining project; borrow pit rehabilitation and conversion of the borrow pit into an Earth-Dam are to comply with these legal requirements.
Nature Conservation Ordinance No. 4 of 1975	Chapter 6 provides for legislation regarding the protection of indigenous plants.	Indigenous and protected plants have to be managed within the legal confines.
Environmental Assessment Policy of Namibia (1995)	The Policy seeks to ensure that the environmental consequences of development projects and policies are considered, understood and incorporated into the planning process, and that the term ENVIRONMENT is broadly interpreted to include biophysical, social, economic, cultural, historical and political components.	This EMP considers this term of Environment.

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
Minerals (Prospecting and Mining) Act, 1992 (Act 33 1 of 1992)	To provide for the reconnaissance, prospecting and mining for, and disposal of, and the exercise of control over, minerals in Namibia; and to provide for matters incidental thereto. “Mineral” means any substance, whether in solid, liquid or gaseous form, occurring naturally in, on or under any land and having been formed by, or subjected to, a geological process, excluding -(c) subject to the provisions of subsection (2), soil, sand, clay, gravel or stone (other than rock material specified in Part 2 of Schedule 1) if they are bona fide required for purposes of – (i) agriculture, building works, fencing or road making; (ii) the manufacture of bricks and tiles;	The intended activity involves the mining of sand for construction purposes.
Soil Conservation Act 6 of 1969 Ministry of Agriculture, Water and Forestry	This Act covers the prevention and combating of soil erosion; the conservation, improvement and manner of use of the soil and vegetation; and the protection of water sources	Soils should not be polluted or left unrehabilitated.
The Traditional Authorities Act 25 of 2000	This Act recognises Traditional Authorities (TAs) as legal entities. Among the duties of the TAs with respect to land use are to assist and cooperate with the Government, Regional Councils and Local Authority Councils in the execution of their policies and to keep the members	The Uukwambi Traditional Authority (The Chief of Uukwambi and Onashiku shaLaban village’s headman) has been consulted with regards to the intended activity.

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
	of the traditional community informed of the developmental projects in their area. Furthermore, to ensure that the members of his/her traditional community use the natural resources at their disposal on a sustainable basis and in a manner that conserves the environment and maintains the ecosystems for the benefit of all persons of Namibia.	

8. PROJECT DESCRIPTION

8.1 PROJECT LOCATION

The proposed sand mining activities will take place at Onashiku shaLaban village, Okatana constituency in Oshana Region. Onashiku shaLaban village is situated about 7 km west of Oshakati. The actual activities will take place at an already disturbed area at Onashiku shaLaban village, which belong to Uukwambi Traditional Authority, see the GPS coordinate in **Table 6**, for the proposed project site.

Table 6: GPS coordinates for the proposed sand mining at an already area belonging to Uukwambi Traditional Authority at Onashiku shaLaban village, Okatana constituency in Oshana Region.

GPS POINTS	LATITUDE	LONGITUDE
Borrow pit point A	17° 773611' S	015° 625917'E
Borrow pit point B	17°770917' S	015° 6235'E
Borrow pit point C	17°774128' S	015°624138'E
Borrow pit point D	17° 774212' S	17° 62491' S



Figure 1: Location of Onashiku shaLaban village, Okatana constituency, Oshana Region (Google Earth, 2022).

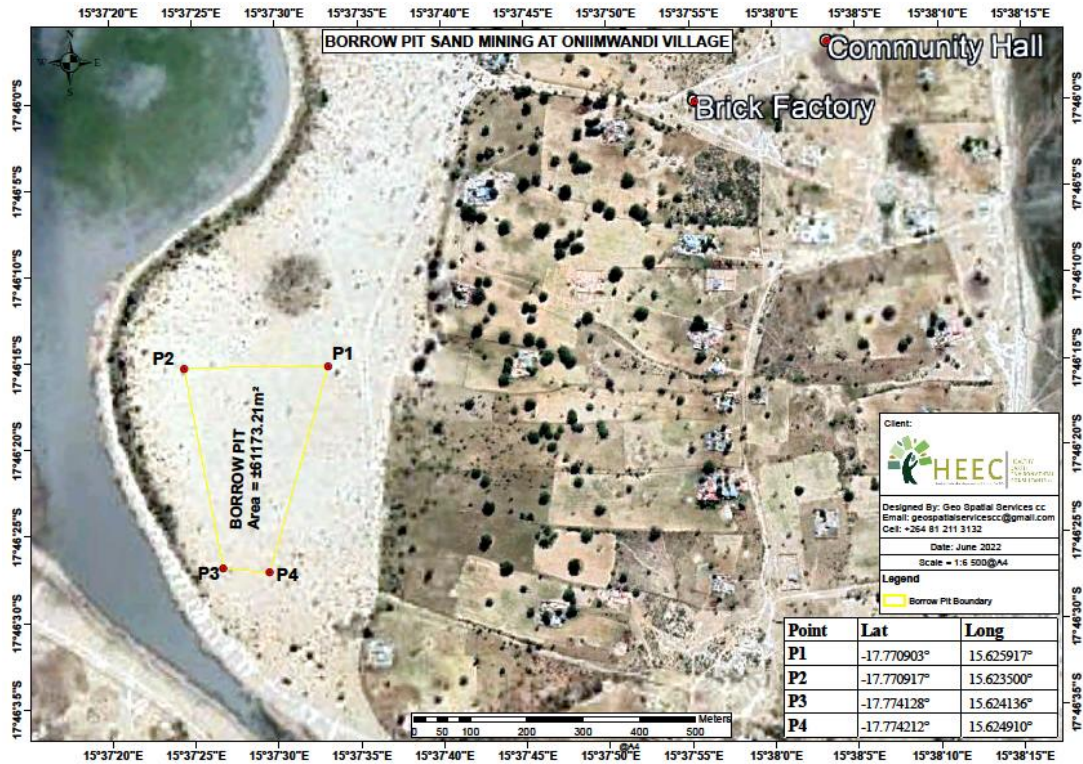


Figure 2: The geometric area of Uukwambi Traditional Authority borrow pit at Onashiku shaLaban village, Okatana constituency, Oshana region (HEEC, 2022).

8.2 CLIMATE

Onashiku shaLaban Village is located in north central Namibia approximately 7 Km west of Oshakati in Okatana Constituency, Oshana Region. Oshakati is one of the fast-growing towns and the major town in northern Namibia. Due to the proximity of Onashiku shaLaban Village to Oshakati, the climate of the area resembles that of Oshakati. The average rainfall amounts to more than 447 mm per year, though in some years it could be double that amount. The rainy season occurs from November to March, reaching a scorching 45° C, but relatively easy to endure due to high humidity (Mendelsohn, 2003). During the other half of the year, from April to October, it does not receive any rain and the average minimum temperatures drop to between 4° and 6° C and at night could drop below freezing point. The differences in temperatures between day and night are less extreme than in other parts of Namibia.

8.3. GEOLOGY

Onashiku shaLaban Village is located within the Cuvelai - Etosha Basin. The Cuvelai - Etosha Basin is located in central, southern Angola and central northern Namibia. The Angolan portion of the basin covers 52 750 square kilometres (km²) or about 36% of the whole basin and the Namibian portion covers 92 250

km² or about 64% of the basin, which means that the total area of the whole basin is about 145 000 km² in extent. The geology of the area is typically silt soil characterized by Cambisols, which is basically a type of soil formed during the geological formation which emanate from the medium and fine-textured parent material deposited during sporadic flooding. Since parent materials in Cambisols are slightly weathered, this type of soil has limited organic materials, aluminum, and iron. However, the fertility of this soil type can be ranged moderate to high due to decent water holding capacity and inner drainage, hence the high fertility of eutric Cambisols in the central northern regions of Namibia have attributed to the potential crop cultivation (Mendelsohn, 2003).

8.4. VEGETATION

The proposed borrow pit for Uukwambi Traditional Authority at Onashiku shaLaban village is situated within the Mixed Tree and shrub savanna (Meldelsohn *et al* 2003). The vegetation in the literal area of the project is sparsely distributed, with few trees and shrubs. The project vicinity is characterized by mixed trees and shrubs species and plain (Oshana). The most notable plant species in the area are *Hyphaene petersiana*, *Pechel-loeschea leubnitziae*, *Acacia hebeclada*, *Terminalia sericea*, *Mundulea sericea*, and *Combretum spp.* The impacts on the flora will be lower during the sand mining phase and upon the conversion of the borrow pit into an Earth-Dam. However, since some of the trees are forestry protected, a permit is required to cut down such plants.

8.5. ALIEN PLANTS ASSESSMENT

A thorough botanical assessment on alien plant was carried out in the proposed project area and it was found that there are no records of alien plants.

8.6. ARCHEOLOGICAL AND HERITAGE RESOURCES

There were no records of artifacts of historical or significant cultural resources found on the literal piece of land ear-marked for this project. However, it is recommended that the borrow pit should be confined to the mapped area.

9. ENVIROMENTAL IMPACT MITIGATION AND MANAGEMENT PLAN

9.0. SAND MINING PHASE

9.1. OVERALL OBJECTIVES OF THE EMP

The following overall environmental objectives have been set for Uukwambi Traditional Authority's sand mining project:

- To act in accordance with the national legislation and standards for the protection of the environment.
- To mitigate possible impacts on biodiversity through the reduction of the footprint (as empirically possible) and the conservation of residual habitats within the sand mining area and the vicinity of Onashiku shaLaban village.
- To ensure that the surrounding communities are well informed of the sand mining activities on the existing borrow pit and conversion of the borrow pit into an Earth-Dam, through the establishment of community meetings and constructive dialogue.
- To warrant that, legal and appropriate management and disposal of general and hazardous waste, through the establishment of approaches for the reduction, recycling, management, temporary storage and removal of waste.
- To devise, execute and manage monitoring systems to warrant a sound environmental performance in respect of the following: waste, air quality, noise, biodiversity, and rehabilitation.

The Management and Mitigation Plans (MMPs), listed in the tables below, are applicable to all the significant activities of the borrow pit at Onashiku shaLaban village belonging to Uukwambi Traditional Authority.

9.3. STAKEHOLDER MANAGEMENT AND MITIGATION

It is vital that the channel of communication is maintained over the project life cycle with the surrounding community, the general public members, as well as the local and traditional authorities, **Table 7** shows the stakeholders communication Management and Mitigation Plan.

Table 7: Actions relating to stakeholder communication

Issue	Management commitment	Phase
Understanding who the stakeholders are	Maintain and update, key stakeholders' needs and expectations. Ensure that all significant stakeholder groups are incorporated.	All
	A representative database would include line ministries, employees, service providers, contractors, indigenous populations, local communities, Traditional Authorities, NGOs, shareholders, community-based organizations, suppliers and the media.	All

	Ensure that vulnerable groups such as woman and youths are also considered in the stakeholder communication process.	All
	Record partnerships as well as their roles, responsibilities, capacity and contribution toward the development.	All
Liaising with interested and affected parties at all phases of the sand mining life cycle	Formulate and implement a stakeholder communication and engagement program.	All
Responsibility	Proponent Representatives (PR) and Environmental Control Officer (ECO)	

The PR and ECO should warrant that the management actions detailed in **Table 8** below should be adhered to during the operation of the sand mining activities and should be carried out in conjunction with all the detailed mitigation measures.

Table 8: Sand Mining Phase Management Actions

<i>Aspect</i>	<i>Management Actions</i>	<i>Responsibilities</i>
Environmental Incidents	<ul style="list-style-type: none"> • The ECO on site shall keep up a register of all environmental incidents taking place due to the activities allied with the project. Environmental incidents that shall be recorded include (but are not limited to): <ul style="list-style-type: none"> ➤ Spills of hazardous materials, contaminating soil or water resources; ➤ Fires; ➤ Drowning; ➤ Accidents (e.g. traffic); ➤ Non-compliances with applicable legislation; and ➤ Non-compliances with this EMP. • Environmental incident reports shall include (as a minimum) a description of the incident, the remedial action taken to control any damage to the environment, personnel, or the public, and the actions taken to fix/contain any such damage. 	Environmental Control Officer (ECO)

<i>Aspect</i>	<i>Management Actions</i>	<i>Responsibilities</i>
	<ul style="list-style-type: none"> Additional actions shall be elucidated that may be needed to remediate damage emanating from the incident and/or to prevent similar incidents re-occurring in the future. 	
Traffic	<ul style="list-style-type: none"> Ensure that road junctions have good sightlines. Limit the type of vehicles (heavy trucks) allowed on site. Adhere to the speed limit. If permissible, caution signs and 40 km/hr speed limit signs shall be erected at regulation distance from heavy vehicle crossing signs at all intersections of the access tracks at Onashiku shaLaban village. Designate no-drive zones. Apply traffic control measures where appropriate by keeping a number plate registry of all vehicles harvesting sand at the borrow pit and restricting access to authorised contractors. 	Environmental Control Officer (ECO)
Borrow pits/Sand mining area	<ul style="list-style-type: none"> Sand should be sourced from a borrow pit with a valid ECC. The mining area must be clearly demarcated by means of a perimeter stock-proof fence with a lockable and gated entrance. Sand mining and resultant operations shall only take place within this demarcated area. A detailed photographic record of the demarcated areas, prior to any mining activities, shall be taken. These records are to be kept by the Proponent and PR for reference purposes during the rehabilitation of the site. 	Proponent/Proponent Representatives (PR) /Environmental Control Officer (ECO)

Aspect	Management Actions	Responsibilities
	<ul style="list-style-type: none"> • There will be ‘No unauthorised access’ signs at the borrow pit gates until the conversion of the borrow pit into an Earth-Dam is open to the general public. • Excess material may also be deposited in open borrow pits around Onashiku shaLaban and surrounding villages as part of the rehabilitation process. 	
EMP training	<p>All workers at the site are to undertake EMP training that should entail the following:</p> <ul style="list-style-type: none"> • Explanation of the significance of complying with the EMP. • Dialogue of the likely environmental impacts of the intended sand mining and conversion of the borrow pit into an Earth-Dam project. • Employees’ roles and responsibilities, entailing emergency preparedness and response requirements. • Explanation of the mitigation measures that must be implemented when certain work groups execute their respective activities. • The likely consequences of departure from specified operating procedures; and rewards for enhancing mitigation measures or avoiding possible negative environmental impacts. 	Proponent Representatives (PR) / Environmental Control Officer (ECO)
Fauna and Flora	<ul style="list-style-type: none"> • Prevent the destruction of protected tree species. • Foster the regrowth and regeneration of trees with exposed roots at the site. • The excavation of the sand should incorporate existing trees. 	Proponent Representatives (PR) /Environmental Control Officer (ECO)

<i>Aspect</i>	<i>Management Actions</i>	<i>Responsibilities</i>
	<ul style="list-style-type: none"> • The contractor should compile a Tree Management Plan which should include the following as a minimum: <ul style="list-style-type: none"> ○ Trees if not already accounted for in an existing Geographic Information System (GIS), should be surveyed, co-ordinates/location incorporated into the contractor's GIS, marked with paint (or other means so as to be readily visible) and protected; ○ Trees which are impossible to conserve, need to be identified and their location recorded on a map; ○ The Uukwambi Traditional Authority should apply to the Ministry of Environment, Forestry and Tourism for a permit to remove the protected trees. ○ A list should be compiled of all trees to be removed detailing the location of the tree, the species as well as which trees will be planted as compensation. The nursery where these trees will be sourced from should also be included; ○ Each tree that is removed needs to be replaced with an indigenous tree species; Some of these trees can be obtained at the nearest forestry office at Ongwediva or at any commercial nursery. Assistance can be sought from the Ongwediva forestry office regarding nearby nurseries where additional trees may be bought. • Only a limited width +/- 5 m on the side of the access roads may be partially cleared of vegetation. 	

Aspect	Management Actions	Responsibilities
	<ul style="list-style-type: none"> • Workers are prohibited from collecting wood or other plant products on or near the site. • No alien species may be planted on or within the existing site. • Prevent contractors from collecting wood and veld food such as amphibians, migratory birds, etc. during the sand mining and conversion of the borrow pit into an Earth-Dam construction phases. • Hunting in the vicinity of the sand mining project and the entire village must be avoided at all costs. 	
Lay-down areas and materials camp	<p>Suitable locations for the contractors lay-down areas and materials camp should be identified with the assistance of the PR and Uukwambi Traditional Authority and the following should be considered in selecting these sites:</p> <ul style="list-style-type: none"> • The areas designated for the services infrastructure should be used as far as possible. • Second option should be degraded land. • Avoid sensitive areas (e.g., plains (<i>iishana</i>) and drainage lines) 	Proponent Representatives (PR) /Environmental Control Officer (ECO)
Hazardous waste	<ul style="list-style-type: none"> • All heavy-duty vehicles and equipment on site should be provided with a drip tray. • All heavy-duty vehicles transporting sand should be maintained and serviced regularly to avoid oil leakages. • Maintenance and washing of vehicles should take place only at a designated workshop and car wash in the area or nearby town such as Oshakati. 	Proponent Representatives (PR) /Environmental Control Officer (ECO)

Aspect	Management Actions	Responsibilities
	<ul style="list-style-type: none"> All hazardous substances (e.g. fuel etc.) or chemicals should be stored in a specific location on an impermeable surface that is bonded - with a volume of 120 % of the largest single storage container or 25 % of the total storage containers, whichever is greater. 	
Surface and Ground Water Impacts	<ul style="list-style-type: none"> It is recommended that sand harvesting should not take place during the rainy season to limit erosion and flooding on site and surface water pollution. No dumping of waste products of any kind in or in close proximity to surface water bodies. Heavy duty vehicles should be kept out of any surface water bodies and the movement of vehicles should be limited where possible to the existing access roads and tracks. Contaminated runoff from the sites should be prevented from entering the surface water bodies. Workers should be given ablution facilities at the sites that are located at least 30 m away from any surface water and regularly maintained. Washing of personnel or any equipment should not take place on site. 	Proponent Representatives (PR) /Environmental Control Officer (ECO)
Topsoil	<ul style="list-style-type: none"> When excavations are carried out, topsoil should be stockpiled in a demarcated area and used in profiling and rehabilitating of the open borrow pits in the vicinity of Onashiku shaLaban village. Stockpiled topsoil should be used to rehabilitate post-harvesting degraded areas and/or other nearby degraded areas within Onashiku shaLaban village. 	Proponent Representatives (PR) /Environmental Control Officer (ECO)

<i>Aspect</i>	<i>Management Actions</i>	<i>Responsibilities</i>
Soil Erosion	<ul style="list-style-type: none"> • Clear the vegetation of the project area in phases during the sand mining period in order to keep the soil more compacted as well as to limit entire soil disturbance over time. • It is recommended that most sand harvesting takes place outside of the rainy season in order to limit potential flooding and the run off of loose soil causing further soil erosion. • Appropriate erosion control arrangement must be put in place where soil may be vulnerable to erosion. • Inspections must take place at regular intervals to identify areas within the site where erosion is happening. Suitable remedial actions are to be undertaken wherever erosion is evident. 	Proponent Representatives (PR) /Environmental Control Officer (ECO)
Rehabilitation	<ul style="list-style-type: none"> • Upon completion of the sand mining phase, Uukwambi Traditional Authority should consult the local community pertaining to post-sand mining use of the remaining excavated areas (if applicable) and to identify significant areas for alternative uses. • Sand at the site should be levelled so it can be reclaimed for other purposes such as an Earth-Dam. The verge of the borrow pit should have a slope which does not pose danger to human and animals. Once the sand mining has stopped and rather than leaving the borrow pit open, which will pose a threat to people and animals in the area, it will be converted into an Earth-Dam so as to make available at Onashiku shaLaban village. 	Proponent Representatives (PR) /Environmental Control Officer (ECO)

<i>Aspect</i>	<i>Management Actions</i>	<i>Responsibilities</i>
	<ul style="list-style-type: none"> • In the event that no post-operation uses accomplished, all excavated/degraded areas need to be rehabilitated as follows: <ul style="list-style-type: none"> ○ Excavated areas may only be backfilled with clean or inert fill. No material of hazardous nature (e.g. sand removed with an oil spill) may be deposited as backfill. ○ Rehabilitated excavated areas need to match the contours of the existing landscape. ○ The rehabilitated area should not be higher (or lower) than nearby drainage channels. This ensures the efficiency of re-vegetation and minimise the chances of potential erosion. ○ Topsoil is to be spread across excavated areas evenly. ○ Deep ripping of areas to be rehabilitated is needed, not just simple scarification, so as to enable rip lines to hold water after heavy rainfall. ○ Ripping should be done along slopes, not up and down a slope, which could lead to enhanced erosion. 	
HIV/AIDS and TB awareness	<ul style="list-style-type: none"> • The Uukwambi Traditional Authority should approach the Ministry of Health and Social Services to co-opt a health officer to facilitate HIV/AIDS and TB education programmes at regular intervals on site during the project operation. • A wellness program should be in place to raise awareness on health issues, especially the impact of sexually transmitted diseases. 	Contractors/Proponent Representatives (PR) /Environmental Control Officer (ECO)

<i>Aspect</i>	<i>Management Actions</i>	<i>Responsibilities</i>
	<ul style="list-style-type: none"> • Provide free condoms in the workplace and to local community throughout project operation. • Smoothen the progress of access to anti-retroviral medication • Foster employees to undertake voluntary Covid 19 vaccination. • Personnel should not overnight at the sand mining site, only security personnel. 	
Road safety	<ul style="list-style-type: none"> • Demarcate roads clearly. • Off-road driving should not be allowed. • All vehicles that transport sand from the borrow pit must be roadworthy. • Heavy duty drivers that transport mined sand should have a valid driver's license and should comply with all traffic rules. • Loads upon vehicles should be properly secured to avoid items falling off the vehicle. The loading box for the entire vehicle transporting sand from the borrow pit should be covered completely with an intact net. • Limit and control the number of access points to the site. • The road leading to the borrow pit should be properly maintained so as to reduce dust emissions when heavy vehicles use the roads. • Consideration should be given to possibly upgrade the road leading to the borrow pit. 	Proponent Representatives (PR) /Environmental Control Officer (ECO)

<i>Aspect</i>	<i>Management Actions</i>	<i>Responsibilities</i>
Safety around work sites	<ul style="list-style-type: none"> • Excavate short lengths of trenches and box areas for services or foundations in a manner that will not leave the trench unattended for more than 24 hours. • Delineate excavated areas and topsoil stockpiles with danger tape. • Provide additional warning signage in areas of movement and in “no personnel” areas where workers are not active. The assembly point should be clearly demarcated. • The Borrow pit is to be fenced-off with stock-proof perimeter fencing. • Work areas must be set out and isolated with danger tape on a daily basis. • All materials and equipment are to be stored only within set out and demarcated work areas. • Only sand mining personnel will be permitted within these work areas. • At least one fire extinguisher should be available in any vehicle harvesting and transporting sand. • Skipper container or wheel bins should be made available at the borrow pit. • Comply with all waste related management actions stated above in this EMP and all measures in the recently adopted national solid waste management strategy document should be made available to the personnel. 	Proponent Representatives (PR) /Environmental Control Officer (ECO)
Ablutions	<ul style="list-style-type: none"> • Distinct toilets facility should be made available for men and women and should clearly be indicated as such. • Portable toilets (i.e. easily transportable) should be available at the borrow pit site: 	Proponent Representatives (PR) /Environmental Control Officer (ECO)

<i>Aspect</i>	<i>Management Actions</i>	<i>Responsibilities</i>
	<ul style="list-style-type: none"> ○ 1 toilet for every 15 females. ○ 1 toilet for every 30 males. ○ Sewage needs to be removed on a regular basis to an approved (municipal) sewage disposal site i.e., Oshakati Town Council. If possible, sewage may be pumped into sealable containers and stored until it can be removed. ○ Workers responsible for cleaning the toilets should be provided with latex gloves and masks. 	
Open fires	No open fires may be made anywhere on site.	Proponent Representatives (PR) /Environmental Control Officer (ECO)
General health and safety	<ul style="list-style-type: none"> ● A fully stocked first aid box should perpetually be available on-site as well as an adequately trained staff member in a position to administer first aid. ● All workers should have access to the appropriate Personal Protective Equipment (PPE). ● Adequate potable water reserves should be available to workers at all times. ● No person should be allowed to smoke close to vehicle with a running engine, fuel storage facilities or portable toilets (if toilets are chemical toilets – the chemicals are flammable). ● No workers should be allowed to drink alcohol during work hours. ● No workers should be allowed on site if under the influence of alcohol. 	Contractors/Proponent Representatives (PR) /Environmental Control Officer (ECO)

<i>Aspect</i>	<i>Management Actions</i>	<i>Responsibilities</i>
Dust	<ul style="list-style-type: none"> • A watering truck should be used on gravel roads with the heaviest vehicle movement especially during dry and windy conditions. However, suitable consideration should be provided to water restrictions during times of drought. • Cover any stockpiles with plastic to reduce windblown dust. • Dust protection masks should be provided to all workers if they complain about dust. • During high wind conditions the contractor must make the decision to stop works until the wind has calmed down. 	Proponent Representatives (PR) /Environmental Control Officer (ECO)
Noise	Work hours should be restricted to between 08h00 and 17h00 where excavation involving the use of heavy equipment, power tools and the mobility of heavy vehicles is less than 500 m from residential areas. If an exception to this provision is required, all residents and business owners within the 500 m radius should be given 1 week's written notice.	Contractors/ Proponent Representatives (PR) /Environmental Control Officer (ECO)
Recruitment of labourers	<p>The Uukwambi Traditional Authority should compile a formal recruitment process including the following provisions as a minimum:</p> <ul style="list-style-type: none"> • Adhere to the legal provisions in the Labour Act No. 11 of 2007 for the recruitment of labour (target percentages for gender balance, optimal use of local labour and SME's, etc.). • Recruitment should be carried out through the Uukwambi Traditional Authority. 	Contractors/Proponent Representatives (PR) /Environmental Control Officer (ECO)

Aspect	Management Actions	Responsibilities
	<ul style="list-style-type: none"> • Ensure that all sub-contractors are aware of recommended recruitment procedures and discourage any recruitment of labour outside these agreed upon procedures. • All contractors should give preference in terms of recruitment of sub-contractors and individual labourers to those who are qualified and from Onashiku shaLaban village and only then look to surrounding villages. • Clearly explain to all job-seekers the terms and conditions of their respective employment contracts (e.g. period of employment etc.) – make use of interpreters where desired. 	
Communication plan	<p>The contractor or PR should formulate a Communication Plan, which should details following:</p> <ul style="list-style-type: none"> • How Interested and Affected Parties (I&APs), who require on-going communication for the duration of the sand mining operation period, will be identified and recorded and who will administer and update these records; • How these I&APs will be consulted on a regular basis; • Make provision for grievance mechanisms – i.e. how concerns can be lodged/ recorded and how feedback will be rendered. 	Contractors / Proponent Representatives (PR) /Environmental Control Officer (ECO)
General communication	<ul style="list-style-type: none"> • The Uukwambi Traditional Authority must appoint an ECO to liaise between the contractor, and I&APs. • The Uukwambi Traditional Authority shall at every bi-monthly site meeting report on the status of the execution of all provisions of the EMP. 	Proponent Representatives (PR) /Environmental Control Officer (ECO)

<i>Aspect</i>	<i>Management Actions</i>	<i>Responsibilities</i>
	<ul style="list-style-type: none"> • The Uukwambi Traditional Authority should implement the EMP awareness training as stipulated above. • The Uukwambi Traditional Authority must list all I&APs of the project and their contact details with whom regular communication would be required for the duration of the contract. This list, together with the Communication Plan must be agreed upon and given to the PR before operation commences/resumes. • The Communication Plan, once agreed upon by the all I&A parties, shall be legally binding. • A copy of the EMP must be made available at Uukwambi Traditional Authority office and the site office and should be accessible to all I&APs. • Key representatives should be notified well in advance and invited to attend monthly site meetings to raise any concerns and issues concerning progress to rehabilitate the borrow pit. • The contractor should liaise with the proponent pertain all issues related to community consultation and negotiation before operation commences/resumes. • A procedure should be put in place to ensure that concerns raised have been followed-up and action taken. • All people on the I&APs list should be informed about the availability of the complaints register and associated grievance procedure in writing by the PR prior to the commencement of site activities. 	

<i>Aspect</i>	<i>Management Actions</i>	<i>Responsibilities</i>
Archaeology	<ul style="list-style-type: none"> ● Should a heritage site or archaeological site be uncovered or discovered during the sand harvesting or conversion of the borrow pit into an Earth-Dam project, a “chance find” procedure should be applied in the order they appear below: <ul style="list-style-type: none"> ○ If operating machinery or equipment stop work; ○ Demarcate the site with danger tape; ○ Determine GPS position if possible; ○ Report findings to the site contractor and proponent; ○ Report findings, site location and actions taken to contractor and proponent; ○ Cease any works in immediate vicinity; ○ Visit find site and determine whether work can proceed without damage to findings; ○ Determine and demarcate exclusion boundary; ○ Site location and details to be added to a Geographic Information System (GIS) for field confirmation by archaeologist; ○ Inspect site and authenticate addition to sand mining site GIS; ○ Advise the National Heritage Council (NHC) and request written permission to remove findings from work area; and ○ Recovery, packaging and labelling of findings for transfer to National Museum. ● Should human remains be found, the following actions will be required: <ul style="list-style-type: none"> ○ Apply the chance find procedure as described above; 	Proponent Representatives (PR) /Environmental Control Officer (ECO)

<i>Aspect</i>	<i>Management Actions</i>	<i>Responsibilities</i>
	<ul style="list-style-type: none"> ○ Schedule a field inspection with an archaeologist to confirm that remains are human; ○ Advise and liaise with the NHC and Police; and ○ Remains will be recovered and removed either to the National Museum or the National Forensic Laboratory. 	

10. CONVERSION OF THE BORROW PIT INTO AN EARTH-DAM CONSTRUCTION PHASE

The management actions included in **Table 9** below apply during the conversion of the borrow pit into an Earth-Dam, Construction phase of the development and should be undertaken together with the mitigation measures designed for this project.

Table 9: Conversion of the Borrow Pit into an Earth-Dam Management Action

<i>Environmental Feature</i>	<i>Management Actions</i>	<i>Responsibilities</i>
EMP training	All contractors appointed for the transportation of the sand to various construction sites must be aware of appropriate health, safety and environmental considerations relevant to their respective work.	Proponent Representatives (PR) /Environmental Control Officer (ECO)
Monitoring	<p>The ECO should monitor the execution of the EMP:</p> <ul style="list-style-type: none"> • The ECO should frequently inspect the conditions around the borrow pit site before work starts; and • The ECO should inspect the borrow pit site at the end of the manufacturing period. 	Proponent Representatives (PR) /Environmental Control Officer (ECO)

<i>Environmental Feature</i>	<i>Management Actions</i>	<i>Responsibilities</i>
Water and waste management	<ul style="list-style-type: none"> • A no-go buffer area of at least 30 m should be allotted to any water bodies in the area. • No dumping of waste products of any sort in or immediate proximity to any surface water bodies. • Sufficient weather and scavenger-proof bins (with lids, to prevent the escape of litter) shall be provided, and be easily accessible at all points where wastes are generated. • The borrow pit site shall be kept clean and free of litter and no litter from the site shall be allowed to scatter around sand mining areas. • All personnel shall be educated to dispose of all waste in an appropriate manner. • The Uukwambi Traditional Authority shall identify and sort waste materials that can be reused or recycled to reduce waste e.g. bottle, metals, packaging and plastics, and provide segregate marked bins for these items. • The Uukwambi Traditional Authority shall be responsible for the regular disposal (at suitable and licensed municipal waste disposal facilities in Oshakati) of all waste generated as a result of the sand mining project. • Contaminated runoff from the various operational activities should be prohibited from inflowing into any surface water bodies. 	Proponent Representatives (PR) /Environmental Control Officer (ECO)

<i>Environmental Feature</i>	<i>Management Actions</i>	<i>Responsibilities</i>
	<ul style="list-style-type: none"> • Warrant that surface water accumulates on-site are channelled and harvested by a proper storm water management system to be treated in a suitable manner before disposal into the environment. • Disposal of waste from the sand mining area should be properly managed. • No combustion of waste on site. • General waste is to be collected either by a legitimate waste collecting company or removed by the Uukwambi Traditional Authority. • The frequency of collections will be such that waste containment receptacles do not unduly amass or overflow. 	

11. DECOMMISSIONING PHASE

According to the provisions of the Environmental Management Act, 2007 it is necessary to take into account the impacts on the environment during the decommissioning phase of the project. Namibian legislation considers decommissioning as a separate activity and an EIA should therefore be carried out prior to its decommissioning. Recommendations to be considered prior to decommissioning:

- A closure plan should be formulated by the proponent (Uukwambi Traditional Authority) at least 2 years prior to the expected date of decommissioning. This closure plan must identify the targets and objectives for decommissioning and the operations working towards this end.
- Consultations from specialists must be carried out by the Uukwambi Traditional Authority in order to ensure that the decommissioning phase is in line with the prevailing best practice trends, to diminish the potential risks and economic costs to carry out this process.
- Stakeholder engagement is imperative at this phase to ensure that the local communities' interests are known and their responsibilities from the commencement of the project are addressed.

The decommissioning of the sand mining at the borrow pit site at Onashiku shaLaban village is envisaged in the near future so as to convert this particular borrow pit into an Earth-Dam for water harvesting purposes and supply the community and livestock at Onashiku shaLaban village. The conversion of the borrow pit into an Earth-Dam will thus promote water retention and make water available for livestock in the village. When the conversion of the borrow pit into an Earth-Dam happens recommendations have been detailed in the table below (Table 10).

Table 10: Decommissioning phase management actions

<i>Environmental Feature</i>	<i>Management Actions</i>
Deconstruction activity	Many of the mitigation measures outlined in this sand mining project at Onashiku shaLaban village, Okatana constituency, Oshana Region; borrow pit rehabilitation and conversion of the borrow pit into an Earth-Dam (Table 9 above) would be significant to some of the decommissioning activities. These should be complied with where possible.
Rehabilitation	In the event that decommissioning is necessary, excavations need to be rehabilitated as detailed accordingly in the management actions provided in Table 9 above.

12. SUMMARY OF IDENTIFIED ENVIRONMENTAL IMPACT FOR THE SAND MINING PROJECT

As part of the assessment processes for the sand mining project at Onashiku shaLaban village belonging to Uukwambi Traditional Authority, environmental aspects, and potential environmental impacts associated with the activities and facilities were identified. Detailed EMP for the borrow pit belonging to Uukwambi Traditional Authority associated with the construction, operation, decommissioning, and closure phases are described in the tables above for the operational phase. **Table 11** provides a summary description of the environmental aspects that are associated with sand mining operations and their ratings on the significance of the impact on the biophysical and human environments, respectively.

Table 11: Summary of potential cumulative impacts associated with the proposed project

Section	Potential impact	Significance of the impact (the ratings are negative unless otherwise specified)	
		Unmitigated	Mitigated
Groundwater	Groundwater Resources	M	L

Resources	Reduction of Aquifer Thickness	L	L
	Groundwater Quality	M	L
Biodiversity	Physical destruction of biodiversity from clearing land	H	L
	Loss of biodiversity from the loss of subsurface water resources	H	L
	General disturbance of biodiversity	H	L
Surface Water Runoff	Alteration to the natural flood dynamic	L	L
	Surface Water Quality	M	L
Air quality	Air pollution from dust and use of vehicle and diesel engine	L	L

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APPENDICES

Appendix A: The area proposed for the borrow pit for Uukwambi Traditional Authority, Onashiku shaLaban village



Appendix B: Some of the plants likely (*Hyphaene petersiana*) to be affected by the sand mining project at Onashiku shaLaban village



Appendix C: Tipper Truck to be used in transporting sand by Uukwambi Traditional Authority (UTA)



Appendix D: Consent letter from Uukwambi Traditional Authority (UTA)

Appendix E: Pro Forma Environmental Contract for Sand Mining

Appendix F: Curriculum Vitae for the Environmental Assessment Practitioner