Tortoise Environmental Consultants(TEC)
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ENVIRONMENTAL SCOPING REPORT (ESR)

FOR THE APPLICATION OF AN ENVIRONMENTAL CLEARANCE CERTIFICATE FOR THE PROPOSED CONSTRUCTION OF EARTH DAMS, OSHANA REGION

DECEMBER 2023

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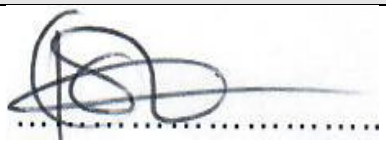
DOCUMENT INFORMATION		
Title	Environmental Scoping Report for the proposed construction of earth dams in Oshana region	
ECC Application Reference number	APP-002393	
Listed Activity	**ACTIVITY 8: Water Resource Development:** • 8.5 Construction of dams, reservoirs, levees and weirs. • 8.8 Construction and other activities in water courses within flood lines. • 8.9 Construction and other activities within a catchment area.	
Location	Oshana Region	
Proponent	Oshana Regional Council Private Bag 5543, Oshakati	
Author:	**Signature**	**Date**
Mr. Ipeinge Mundjulu (EAP)[1]		04 December 2023
Reviewer: Mr. Jonas Heita (EAP)		04 December 2023
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1 EAP – Environmental Assessment Practitioner

Executive Summary

The Environmental Scoping Report presented herein pertains the proposed construction of earth dams in Oshana region, Namibia. Initiated by the Oshana Regional Council (ORC), this project aims to address the acute water scarcity in Namibia, aligned with the country's fundamental developmental goals outlined in the 5th National Development Plan (NDP5). With the severe climatic conditions characterized by limited rainfall and high evaporation rates, the construction of earth dams emerges as a strategic solution to enhance water harvesting for sustainable rural development.

This project is a listed activity mandatorily requiring an Environmental Clearance Certificate (ECC) under the Environmental Management Act of 2007 (EMA), complies with regulatory obligations and necessitates a robust Environmental Impact Assessment (EIA) to delineate potential impacts and mitigation strategies. The document particularly outlines the administrative, policy, and regulatory framework guiding the project, ensuring adherence to environmental preservation and sustainable resource utilization.

The Oshana Regional Council is encouraged to conduct the construction activities within the recommended mitigation and rehabilitation parameters. The water harvesting activities through the construction of earth dams will contribute highly to the socio-economic development of the region hence this project is of high importance. Hence, the Closure and Rehabilitation Plan suggests the approach for site rehabilitation post-resource extraction, ensuring progressive rehabilitation to mitigate environmental hazards, safeguarding against soil erosion, and preserving biodiversity.

ACRONYMS

BID	Background Information Document
DEA	Department of Environmental Affairs
DSR	Draft Scoping Report
EA	Environmental Assessment
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
ECC	Environmental Clearance Certificate
ECO	Environmental Compliance Officer
EIA	Environmental Impact Assessment
EMA	Environmental Management Act (No. 7 of 2007)
EMP	Environmental Management Plan
ESR	Environmental Scoping Report
I&APs	Interested and Affected Parties
MEFT	Ministry of Environment, Forestry and Tourism
ORC	Oshana Regional Council
PPE	Personal Protective Equipment
SM	Site Manager
TEC	Tortoise Environmental Consultancy

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1. INTRODUCTION

1.1. Terms of Reference

This document is prepared as part of the Environmental Impact Assessment (EIA) and scoping exercise, aimed at obtaining an Environmental Clearance Certificate (ECC) for the proposed Construction of 11 Earth Dams in Oshana Region.

1.2. What is an EIA?

An Environmental Impact Assessment (EIA) is a tool to manage negative environmental impacts that may arise from the proposed development and is aimed at guiding the proposed activities to be more environmentally friendly and to comply with the provisions of the Environmental Management Act (Act No.7 of 2007).

The aim of the EIA is to reduce negative impacts (effects) and maximize positive impacts, through the adoption of best environmental practices and application of the precautionary principle

1.3. Demand for water

Namibia is the driest country in southern Africa. The country's climatic condition is characterized by high temperatures and periodic low rainfall. The country experiences high climatic variability in the form of persistent droughts, unpredictable and highly variable rainfall patterns, temperatures, and scarcity of water. High solar radiation, low humidity and high temperatures lead to very high evaporation rates, about five times greater than the average rainfall. Lack of water is one of the key limitation factors to Namibia's development.

Government has prioritised the construction of earth-dams for water harvesting. The 5th National Development Plan's (NDP5) Water strategies and Desired outcomes for the period 2017-2022 aims to amongst other "maintain the current water infrastructure (Calueque- Oshakati and Etaka Canal Water Supply upgrade, up-grade and construct large earth dams (water harvesting for the rural areas and refurbish boreholes)". Thus, water harvesting in a high priority.

1.4. Water Harvesting Rationale

To supply water for:

- **Young development initiatives:** horticultural project through irrigation
- **Livestock farming:** Drinking water for livestock especially during draught seasons.

1.5. Ongoing Sand Mining Activities and EIA Scope

The sand mining activity is already taking place and hence the scoping exercise is more of a remedial action to ensure compliance to the Environmental Management Act (Act No. 7 of 2207)

1.6. EIA Process

An EIA is a systematic process of identifying, predicting, evaluating and mitigating the potential environmental and social effects that may arise from the activities of a proposed project.

1.6.1 Identification and Mitigation of Impacts

The backbone of the EIA report entails identification of impacts (whether real or perceived) and recommendations on suitable mitigation measures to ensure compliance with the principles of environmental management and highlight risks and measures to ensure an environmentally friendly development.

1.6.2 Purpose of the EIA Scoping Exercise

The purpose of this EIA scoping exercise is to:

a) Provide description of the proposed activity;
b) Describe the affected environment (proposed area),
a) Identify potential environmental impacts / aspects of concern;
b) Describe the methodology followed to assess the potential impacts;
c) Mitigate negative impacts that may arise from the proposed project

1.6.3 Rehabilitation

The EIA should not only focus on mitigating the impacts of the activity during the active operations but also should go further and recommend rehabilitation measures at project closure (when activities cease). Rehabilitation measures should not be parked waiting for project closure but should be implemented form the beginning and incrementally throughout the project lifespan.

1.6.4 Scope and Purpose of this Report

The purpose of this report is to present the findings of the EIA for the proposed construction of earth dams, as part of the application of the Environmental Clearance Certificate (ECC).

The environmental assessment has been undertaken in accordance with the requirements of the Environmental Management Act, 2007 and the EIA Regulations.

1.6.5 Application for ECC

Upon completion, the EIA Scoping Report and Environmental Management Plan (EMP), will be submitted to the Environmental Commissioner in the Ministry of Environment, Forestry and Tourism (MET), for review and decision, in accordance with Section 8 of the EIA Regulations.

1.6.6 Environmental Assessment Practitioner

Tortoise Environmental Consultants (TEC) has been appointed to carry out the requisite Environmental Impact Assessment (EIA) and develop an Environmental Management Plan (EMP).

1.7. Alternatives Considered

As stipulated in the Environmental Management Act (EMA) and EIA regulations, alternatives should be considered during the project design, to determine if an alternative site (different locality) or alternative project (different activity) would yield better environmental and socio-economic benefits.

- The proposed earth dam sites are in various villages in the Oshana Region, comprising of bushes, shrubs and mopane trees in some areas hence, it is not highly sensitive to the proposed construction of earth dams.
- The construction sites have already been identified and the impacts have been assessed, hence there will be no need to consider an alternative site unless a change in land use occurs in future.

1.8. Environment vs Economic Development

Namibia's economy is highly dependent on a healthy environment and striking a balance in meeting demands for economic development (e.g water resource development) and maintaining biological diversity can be a challenge. Therefore, the environment and development sectors should work together and identify synergies in order to ensure that natural resources are harvested in a sustainable manner.

Development takes place on land (in the environment) and hence the quest for economic development requires a trade-off with certain parts of the environment in-order for the development to be realized. Meaning, for development to take place, some part of the environment will be affected. However, such impacts should be mitigated through the EMP.

The aim of environmental assessments is to guide the sustainable utilization of natural resources and to mitigate negative impacts that would otherwise compromise the environmental integrity and future ecosystem benefits.

2 PROJECT INFORMATION

2.6 Project Location

The earth dams will be constructed in various constituencies in Oshana region. Each of the 11 constituencies will have one earth dam (figure 2.1).

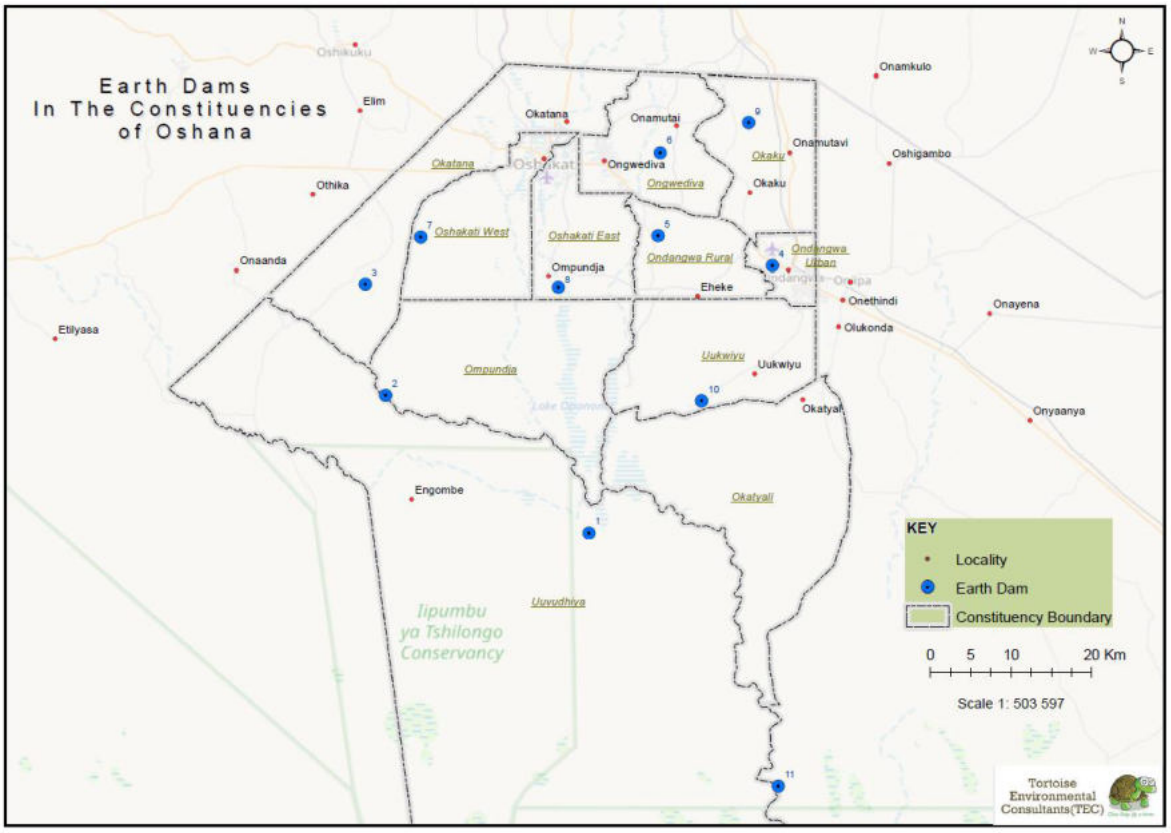

Figure 2-1: Proposed earth dam sites

2.7 Biodiversity and ecology of the area

2.7.1 Vegetation

The presence and varieties of plants within a region are shaped by the soil type, geological features, and the prevailing rainfall patterns. In Oshana, the vegetation biome predominantly falls under the Tree-and-shrub Savannah category, characterized by the Cuvelai drainage and Mopane shrubland. However, the northern areas of Oshana exhibit notably low plant biomass production. This region's vegetation also suffers degradation due to its dense population concentration and widespread subsistence farming practices.

Several species of plants occurring in Oshana are categorised as Protected Plant species of Namibia. Amongst these include:

- *Colophospermum mopane* (Omusati)

- *Berchemia discolor (*Bird plum, Eembe*)*
- *Acacia erioloba (*Camethorn, Omuthiya*)*
- *Ziziphus mucronate (*Omusheshete*)*
- *Diospyros mespiliformis (*Jackalberry, Eenyandi*)*
- *Sclerocarya birrea (*Marula, Omugongo*)*
- *Hyphaene petersiana (*Makalani palm, Omulunga*)*
- *Commpiphora Africana (*Hairy corkwood*)*
- *Devil's claw (*omalyata

2.7.2 Fauna

The local fauna primarily consists of domestic animals like cattle, sheep, goats, and donkeys. Additionally, there's a seasonal presence of freshwater fish, frogs, reptiles, various bird species, and numerous aquatic animals that often emerge during the rainy seasons.

2.7.3 Climatic Conditions (rainfall and wind)

Oshana is one of the warmest regions in Namibia with average daily maximum temperatures of 33°C. It falls within a zone characterized by the highest solar radiation, measuring between 6.2-6.4 kWh/m3/day, primarily due to the region's elevated position in north-central Namibia (TEC, 2023). Classified as semi-arid, Oshana receives an average annual rainfall ranging from 300 to 450mm. However, rainfall in this region is notably erratic, leading to both occasional floods and frequent droughts in recent times. The period between 2013 to 2016 marked one of the most severe droughts of the past decade, significantly impacting food security (TEC, 2023).

3 LEGAL AND DEVELOPMENTAL FRAMEWORK

This chapter outlines the regulatory framework applicable to the proposed project. Table 2 provides an overview of applicable policies, plans and strategies and Table 3.1 provides a list of applicable national legislation.

3.6 Compliance to the EMP to the Environmental Management Act

Section 27 of the Environmental Management Act 2007 (Act No. 7 of 2007) (EMA) provides a list of activities that may not be undertaken without an Environmental Clearance Certificate (ECC) (herein referred to as: listed activities). The proposed expansion of the hospital triggers the following listed activities.

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 impacts on the environment are to be mitigated controlled and monitored."

3.7 Listed Activities

Listed Activities may not be undertaken without an Environmental Clearance Certificate (ECC), and hence an Environmental Impact Assessment (EIA) is required.

As the organ of state responsible for management and protection of its natural resources, the MET: DEA is committed to pursuing the principles of environmental management. The EMA provides a list of activities that require an EIA and the proposed construction of earth dams is among the listed activities or activities that may not be conducted without at ECC. The purpose of listed activities for projects is to ensure that the associated impacts on the environment are carefully considered.

The proposed construction of earth dams triggers a number of Listed Activities as set out in the Environmental Management Act, 2007 (Act No. 7 of 2007) (herein referred to as the EMA) and the Environmental Impact Assessment Regulation, 2007 (No. 30 of 2011) (herein referred to as the EIA Regulations).

Table 3-1: Listed Activities triggered by the proposed project

Activity	**Applicability**
8. Water Resource Development	The project entails the construction of earth dams for water harvesting for activities

8.5 Construction of dams, reservoirs, levees and weirs. 8.8 Construction and other activities in water courses within flood lines. 8.9 Construction and other activities within a catchment area.	such as farming (for livestock), youth development activities such as irrigations, brickmaking and many others.

3.8 Additional Permits

There are no additional permits required for this project.

3.9 Extended developmental and Legal Framework

In addition to the EMA and the Environmental Assessment Policy, there exists a host of legal and policy documents and guidelines that must be considered when undertaking an EIA as indicated in table 3.2, below. The proponent has the responsibility to ensure that the construction of these earth dams conforms to all other National developmental plans and legal framework.

Table 3-2: Policies, Plans and Strategies

Policy / Plan	Relevance	Applicability to the Proposed Project
5th National Development Plan (NDP) and Vision 2030	Outlines the country's National Development Plans (NDPs), in line with the Harambee Prosperity Plan (HPP) and vision 2030	The proposed project is a development that forms part of the bigger picture of achieving economic progression, social transformation and environmental sustainability. Agriculture as a pillar for social well-being, through food production, household income and improved livelihoods

Table 3.2: Other Legal Instruments / National Statutes

National Statutes	Relevance	Applicability to the Proposed Project
Environmental Assessment Policy (1995)	Promotes Sustainable development and Environmental Conservation emphasize the importance of environmental assessments as a key tool towards environmental sustainability	Environmental Protection
Soil Conservation, 1969 (Act 76 of 1969) and the Soil Conservation Amendment Act (Act 38 of 1971)	Makes provision for the prevention and control of soil erosion	Monitor and apply the soil conservation mechanisms
Forest Act 12 of 2001 Forest Act Regulations 2015	To provide for the protection of the environment and the control and management of forest. Relevant sections: - Approval required for the clearance of vegetation on more than 15 hectares (Section 23, subsection 1 (b)).	Forestry permits maybe required for vegetation clearing
Public Health Act (Act No. 36 of 1919)	Advocates for Public Health and safety	Personal Protective Equipment (PPE)
The Occupational Safety and Health Act No. 11 of 2007	Advocates for employee and public safety, health	In the working context "SAFETY" implies "free from danger"
Local Authority Act No. 23 of 1992 Government Notice of No.116 of 1992.	Advocates for inclusive socio-economic development	Ensure communication and necessary approvals to township developmental activities
National Heritage Act, No. 27 of 2004.	The Act provides provision of the protection and conservation of places and objects with heritage significance.	No heritage features were observed within or around the site. Procedures and mitigation measures presented in the EMP should be applied

4 IMPACT ASSESSMENT METHODOLOGY

4.1 Assessment of Impact Significance

The significance of an impact is determined by considering and measuring the temporal and spatial scales and magnitude of the project and the specific activities associated with the project.

The assessment of the environmental impacts of development activities should strive to be objective and impartial at all times. However, environmental assessment processes can be exposed to subjectivity inherent in attempting to measure significance.

The determination of the significance of an impact depends on both the context (spatial and temporal scale) and intensity of that impact.

4.2 Impact Assessment Criteria

For each impact, the **EXTENT** (spatial scale), **MAGNITUDE** and **DURATION** will be described. These criteria would be used to ascertain the **SIGNIFICANCE** of the impact, firstly in the case of no mitigation and then with the most effective mitigation measure/s in place. The mitigation described in the Scoping Report would represent the full range of plausible and pragmatic measures.

Table 4-1: Assessment criteria for the evaluation of impacts

CRITERIA	CATEGORY	DESCRIPTION
Extent or spatial influence of impact	**National**	Beyond a 20km radius of the site
	Regional	Within a 20 km radius of the site
	Local	Within a 2 km radius of the centre of the site
	Site specific	On site or within the boundaries of the property
	Zero	
Magnitude of impact (at the indicated spatial scale)	**High**	Natural and/ or social functions and/ or processes are *severely* altered
	Medium	Natural and/ or social functions and/ or processes are *notably* altered
	Low	Natural and/ or social functions and/ or processes are *slightly* altered
	Very Low	Natural and/ or social functions and/ or processes are *negligibly* altered
	Zero	Natural and/ or social functions and/ or processes remain *unaltered*

Duration of impact	**Zero**	Zero time
	Short Term	Up to 18 months
	Medium Term	0-5 years (after operation)
	Long Term	5- 10 years (after operation)
	Permanent	More than 10 years (after operation)
Probability	**Definite**	Estimated greater than 95 % chance of the impact occurring.
	Very likely	Estimated 50 to 95% chance of the impact occurring
	Fairly likely	Estimated 5 to 50 % chance of the impact occurring.
	Unlikely	Estimated less than 5 % chance of the impact occurring.
	Zero	Definitely no chance of occurrence
Confidence	**Certain**	Wealth of information on and sound understanding of the environmental factors potentially influencing the impact.
	Sure	Reasonable amount of useful information on and relatively sound understanding of the environmental factors potentially influencing the impact.
	Unsure	Limited useful information on and understanding of the environmental factors potentially influencing this impact.
Reversibility	**Irreversible**	The activity will lead to an impact that is permanent.
	Reversible	The impact is reversible, within a period of 10 years.

4.3 Mitigation Measures

For each impact assessed, mitigation measures should be identified to reduce and/ or avoid negative impacts. These mitigation measures are also incorporated in the Environmental Management Plan (EMP) to ensure that they are implemented throughout the lifespan of the proposed activity. The EMP forms part of the Scoping Report, and upon project approval, the implementation thereof, would become a binding requirement.

4.4 Mitigation Hierarchy

Actions to mitigate a potential impact can be done in as systematic manner as guided by what is referred to as Mitigation Hierarchy (Figure 4.1).

From the onset, the positive impacts of the proposed activity should be enhanced, however, where an impact in is inevitable, the following sequence should be followed.

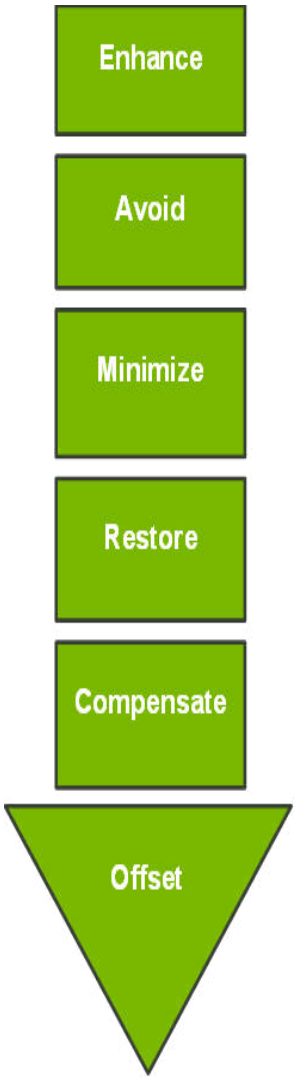

Figure 4-1.Mitigation Hierarchy

Impact avoidance: This step is most effective when applied at an early stage of project conceptualization and planning. It can be achieved by:

- Not undertaking certain projects or elements that could result in adverse impacts;
- Avoiding areas that are environmentally sensitive; and
- Putting in place preventative measures to stop adverse impacts from occurring.

Impact minimisation: This step is usually taken during impact identification and prediction to limit or reduce the degree, extent, magnitude, or duration of adverse impacts. It can be achieved by:

- Scaling down or relocating the proposal;
- Redesigning elements of the project; and
- Taking supplementary measures to manage the impacts.

Impact compensation: This step is usually applied to remedy unavoidable residual adverse impacts. It can be achieved by:

- Rehabilitation of the affected site or environment, for example, by habitat enhancement;
- Restoration of the affected site or environment to its previous state or better; and
- Replacement of the same resource values at another location (off-set), for example, by wetland engineering to provide an equivalent area to that lost to drainage or infill.

5 ENVIRONMENTAL IMPACT ASSESSMENT

This section presents the potential impacts that may arise from the construction activities of the proposed earth dams. The full mitigation measures are presented in the EMP.

5.1 Landscape Alteration

With the excavations and establishment of borrow pits, the sand mining activity has potential to alter (change) the natural view of the landscape.

<table>
<tr><td>IMPACT DESCRIPTION:</td><td colspan="3">Landscape Integrity</td></tr>
<tr><td>Predicted for (specific activity)</td><td colspan="3">Excavations</td></tr>
<tr><td>Dimension</td><td colspan="3">Rating</td></tr>
<tr><td>Duration</td><td>Permanent</td><td rowspan="3">Reversibility:
Reversible</td><td rowspan="4">Degree to which impact can be mitigated:
High</td></tr>
<tr><td>Extent</td><td>Site specific</td></tr>
<tr><td>Magnitude</td><td>Low</td></tr>
<tr><td>Probability</td><td colspan="2">Fairly likely</td></tr>
<tr><td colspan="4">MITIGATION:
• If possible, rehabilitate the earth dam site by refilling the pit with overburden topsoil, to aid the natural process of refilling by wind.</td></tr>
</table>

5.2 Access Roads

Establishment or creation of access roads to drive to the earth dam

<table>
<tr><td>IMPACT DESCRIPTION:</td><td colspan="3">Access Roads</td></tr>
<tr><td>Predicted for (specific activity)</td><td colspan="3">Establishment of Road Tracks</td></tr>
<tr><td>Dimension</td><td colspan="3">Rating</td></tr>
<tr><td>Duration</td><td>Permanent</td><td rowspan="3">Reversibility:
Reversible</td><td rowspan="4">Degree to which impact can be mitigated:
High</td></tr>
<tr><td>Extent</td><td>Site specific</td></tr>
<tr><td>Magnitude</td><td>Low</td></tr>
<tr><td>Probability</td><td colspan="2">Very likely</td></tr>
<tr><td colspan="4">MITIGATION:
• Make only one access road and stick to the access road</td></tr>
</table>

5.3 Earth Dams edges and steepness

Steep borrow pit edges presents potential danger to people and wildlife and should be smoothened to create gentle slopes.

<table>
<tr><td>IMPACT DESCRIPTION:</td><td colspan="3">Earth dam edges and steepness</td></tr>
<tr><td>Predicted for (specific activity)</td><td colspan="3">Excavations</td></tr>
<tr><td>Dimension</td><td colspan="3">Rating</td></tr>
<tr><td>Duration</td><td colspan="2">Long term</td><td rowspan="3">Reversibility:

Reversible</td></tr>
<tr><td>Extent</td><td colspan="2">Site specific</td></tr>
<tr><td>Magnitude</td><td colspan="2">Low</td></tr>
<tr><td>Probability</td><td colspan="2">Very likely</td><td>Degree to which impact can be mitigated:
High</td></tr>
<tr><td colspan="4">MITIGATION:
• Smoothen the earth dam edges to ensure that the angles are not steep sloped, but rather gentle sloped at less than < 30° slope angles.</td></tr>
</table>

5.4 Biodiversity (Fauna and Flora)

Due care should be taken to ensure minimal disturbance to the general landscape of the earth dam sites.

<table>
<tr><td>IMPACT DESCRIPTION</td><td colspan="3">Biodiversity (Fauna and Flora)</td></tr>
<tr><td>Predicted for (specific activity / project phase)</td><td colspan="3">Sand Mining Excavations</td></tr>
<tr><td>Dimension</td><td colspan="3">Rating</td></tr>
<tr><td>Duration</td><td colspan="2">Long term</td><td rowspan="3">Reversibility:

Reversible</td></tr>
<tr><td>Extent</td><td colspan="2">Site specific</td></tr>
<tr><td>Magnitude</td><td colspan="2">Low</td></tr>
<tr><td>Probability</td><td colspan="2">Unlikely</td><td>Degree to which impact can be mitigated:
High</td></tr>
<tr><td colspan="4">MITIGATION:
• Stockpile the topsoil overburden, to be re-used during rehabilitation after mining operations</td></tr>
</table>

5.5 Pollution: Noise and Dust

The proponent should ensure noise from excavator machinery and transportation trucks is kept below the recommended noise levels of -85dB (A).

<table>
<tr><td>IMPACT DESCRIPTION</td><td colspan="3">Noise and Dust</td></tr>
<tr><td>Predicted for (specific activity / project phase)</td><td colspan="3">Extraction and transportations of the sand</td></tr>
<tr><td>Dimension</td><td colspan="3">Rating</td></tr>
<tr><td>Duration</td><td colspan="2">Short term</td><td rowspan="3">Reversibility:

Reversible</td></tr>
<tr><td>Extent</td><td colspan="2">Local</td></tr>
<tr><td>Magnitude</td><td colspan="2">Medium</td></tr>
<tr><td>Probability</td><td colspan="2">Definite</td><td>Degree to which impact can be mitigated:
High</td></tr>
<tr><td colspan="4">MITIGATION:
• Use dust suppression measures to mitigate dust impacts
• Provide dust masks and ear muffs to machinery operators
• Where possible, install silencer on exhaust to reduce noise levels
• Avoid working during times with excessive wind</td></tr>
</table>

5.6 Oil Spills (Pollution)

Soil pollution may occur as a result of oil leakages, fuel, or lubricants from the machinery and vehicles.

<table>
<tr><td>IMPACT DESCRIPTION</td><td colspan="3">Soil Pollution</td></tr>
<tr><td>Predicted for (specific activity / project phase)</td><td colspan="3">Oil Leakages from Machinery</td></tr>
<tr><td>Dimension</td><td colspan="3">Rating</td></tr>
<tr><td>Duration</td><td colspan="2">Short-term</td><td rowspan="3">Reversibility:

Reversible</td></tr>
<tr><td>Extent</td><td colspan="2">Local</td></tr>
<tr><td>Magnitude</td><td colspan="2">Low</td></tr>
<tr><td>Probability</td><td colspan="2">Definite</td><td>Degree to which impact can be mitigated:
Medium</td></tr>
<tr><td colspan="4">MITIGATION:
• There must be an oil spill response kit on site. Workers should be properly trained on dangers oil pollutions and response actions;
• If an oil spill occurs, collect the contaminated soil, store in drums or appropriate structures and dispose at approved waste disposal site;
• Ensure all vehicles / machinery are well service, install drip trays and conduct regular leak inspection</td></tr>
</table>

5.7 Solid Waste Management

Littering and any other unsightly waste at the site or anywhere around the village, as a result of the earth dam construction activities will be an eye sore.

<table>
<tr><td>IMPACT DESCRIPTION:</td><td colspan="3">Solid Waste Management</td></tr>
<tr><td>Predicted for (specific activity / project phase)</td><td colspan="3">Mining Operations</td></tr>
<tr><td>Dimension</td><td colspan="3">Rating</td></tr>
<tr><td>Duration</td><td>Short term</td><td rowspan="3">Reversibility:
Reversible</td><td rowspan="4">Degree to which impact can be mitigated:
High</td></tr>
<tr><td>Extent</td><td>Local</td></tr>
<tr><td>Magnitude</td><td>Medium</td></tr>
<tr><td>Probability</td><td colspan="2">Highly likely</td></tr>
<tr><td colspan="4">MITIGATION:
• No disposal of solid waste on sight
• Adopt the principle of what goes in, goes out</td></tr>
</table>

5.8 Socio-Economic Environment

Water plays an important roles in ensuring socio-economic development (farming, construction, etc) through these activities it contributes to employment creation, food security and improvement of community livelihood.

<table>
<tr><td>IMPACT DESCRIPTION</td><td colspan="3">Socio-economic</td></tr>
<tr><td>Predicted for (specific activity / project phase)</td><td colspan="3">Development and Employment Opportunities</td></tr>
<tr><td>Dimension</td><td colspan="3">Rating</td></tr>
<tr><td>Duration</td><td>Long and Short- term</td><td rowspan="3">Reversibility:
Irreversible</td><td rowspan="4">Degree to which impact can be mitigated:
Medium</td></tr>
<tr><td>Extent</td><td>National & Local</td></tr>
<tr><td>Magnitude</td><td>Medium</td></tr>
<tr><td>Probability</td><td colspan="2">Definite</td></tr>
<tr><td colspan="4">MITIGATION:
• Employ local labour as far as possible
• Establish on the job training and other capacity development training programs</td></tr>
</table>

4 PUBLIC PARTICIPATION PROCESSESS

Public consultation is a requirement by law (EMA No 7 of 2007) to be incorporated into an EIA process, hence it is a fundamental part of the EIA. Public consultation ensures robust decision making by involving Interested and Affected Parties (I&APs). The PPP has therefore been structured to provide I&APs an opportunity to gain more information on the proposed project and for them to provide inputs through the review of documents/reports, and to flag any issue of concern during the PPP process.

6.1 Local Authority Consultation

Consultations were done with the ORC during the EIA field assessment exercise, through which due information and documentation were provided to the Environmental Assessment Practitioner (EAP).

6.2 Public Meeting

- The construction of earth dams is a listed activity hence a scoping exercise is crucial to ensure compliance with the Environmental Management Act (Act. No,7 of 2007) and the Environmental Impact Assessment (EIA) regulations of 2012.

- Public meetings were held in all 11 constituencies in 2022 in the following months: June, August, October and November.

7 CULTURAL HERITAGE

7.1 Cultural Heritage – Legal Requirements

The principal instrument of legal protection for heritage resources in Namibia is the National Heritage Act (27 of 2004), Part V Section 46, which prohibits the removal, damage, alteration or excavation of heritage sites or remains (defined in Part 1, Definitions 1), whilst Section 48 sets out the procedure for application and granting of permits as may be required in the event of damage to a protected site occurring as an inevitable result of the proposed development.

Furthermore, Section 51 (3) sets out the requirements for impact assessment. Part VI Section 55 Paragraphs 3 and 4 require that any person who discovers an archaeological site should notify the National Heritage Council.

In-addition to the National Heritage Act (No. 27 of 2004), international guidelines such as the World Bank OP and BP of 2006, particularly guideline no: 4.11 which refers to the "Physical Cultural Resources" (R2006-0049), and provide direction regarding project screening, baseline survey and mitigation.

Archaeological impact assessment is also a requirement of the Environmental Management Act (7 of 2007) and EIA regulations (Government Notice 30 of 2012) includes the mitigation of impacts on archaeological sites, remains or and artefacts.

7.2 Recommendations

Based on the limitations, it is recommended that:

i. All employees, contractors or sub-contractors working on the construction of earth dams site should be made aware that it is a legal requirement under the National Heritage Act that if any items protected under the definition of heritage is found during the course of development should be reported to the National Heritage Council.

ii. The establishment and management of the earth dams construction poejct should be conducted in a vigilant and cautious manner, and

iii. If any cultural artefacts are found during the construction activities, the necessary steps and due process as presented in the EMP should be followed.

8 REHABILITATION PLAN

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 the construction of earth dams 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 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 earth dams do not become an eye shore.

8.1 What is 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 earth dam with the overburden, re-vegetating, removal of unwanted infrastructure / cleaning up, etc).

8.2 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.

8.3 Rehabilitation Approach

The construction activities must be undertaken in a responsible and environmentally friendly manner. Balancing the demands of progressive development with that of nature is not always clear cut. The importance of minimal disturbance to the general area surrounding the earth dam is therefore highly recommended in order to safeguard the environment. All associated activities should therefore be restricted to the earth dam site.

This plan is a guiding framework for the provisions of rehabilitation and for long term management and monitoring and maintenance of the pit. The closure plan for this project was formulated through the consideration of closure objectives and the implementation of proposed mitigation measure for identified risks.

As explained previously, it is recommended that the rehabilitation process must be progressive, which considers rehabilitation at depleted site as it is suitable due to following reasons:

- Reduces health and safety risk.
- Reduces risk of soil erosion.
- Improves topsoil conservation.
- Reduces an eye sore of pit.

Therefore, the closure and rehabilitation plan for this operation must include the following:

1. Staff awareness of the closure plan
    - Staff must be well inducted of the closure plan during operation and implement progressive rehabilitation.
2. Fencing of the area
    - During operation the earth dam must be fenced off to prevent health and safety risk
3. Site Clean up
    - All foreign material brought during the operation must be removed. There must not be burying of waste material in the pit. All contaminated soils must be removed and disposed of to appropriate site.
4. Process of water harvesting and avoiding pill ups
    - Provision must be made, such as cut-off drain for the permanent drainage to ensure smooth run-off. The cut off drain would be appropriate for each dam, where a deliberate drainage structure would be designed to collect storm water flow into the pit and block out all other materials and waste that comes with the water.
5. Waste material / Overburden
    - Some waste may result from the construction activities but not to produce huge amount of excess overburden. However, those that are produced must be used

for construction or given to the community in case they have use for it as most of it will be sand and rocks.

6. Compaction of disturbed surrounding
    - The surrounding disturbed area from the movement of heavy vehicle must be compacted to prevent run off and wind erosion. The compacted soil must be shallowly ripped to allow regrowth of vegetation.
7. Access roads
    - As described above, all access road that were made for this operation and are no longer necessary, must be rehabilitated. The surface of these roads must be ripped to enable regrowth of vegetation.
8. Safety
    - The above-mentioned rehabilitation may not be adequate to eliminate safety risks. Hence after the removal of the fence, it is recommended that an earthbunds of at least 1m high on the periphery of the earth dam must be constructed. This would also aid in preventing soil erosion.

9 CONCLUSION

The Oshana Regional Council intends to conduct the construction activities within the recommended mitigation and rehabilitation parameters. The water harvesting activities through the construction of earth dams will contribute highly to the socio-economic development of the region hence this project is of high importance.

The Oshana Regional Council would like to conform to the Environmental Management Act of 2007 and EIA regulations of 2012. Upon approval of the Environmental Clearance Certificate, the proponent (Oshana Regional Council) should commit and abide to the recommended mitigation and rehabilitation measures as prescribed in the Environmental Management Plan (EMP).

10 REFERENCES

Burke, A. (2011). Eleven Steps to Mining Rehabilitation, Windhoek, Namibia
Madyise, T. (2013) Case studies of environmental impacts of sand mining and gravel extraction for urban development, Gaborone, Botswana

11 APPENDICES

7.1 EAP CV