Environmental Impact Assessment for the proposed Construction, Operation and Maintenance of the proposed new Oxidation Ponds and a sewer pipe system in Epukiro POS 3, Omaheke region

ENVIRONMENTAL SCOPING REPORT

Prepared for

Omaheke Regional Council
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Namibia

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DOCUMENT INFORMATION

Project Name	Proposed Construction, Operation and Maintenance of the proposed new Oxidation Ponds and a sewer pipe system in Epukiro POS 3, Omaheke region	
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Assessment Period	October to November 2025	

Document Authorization

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Tables of Contents

LIST OF ACRONYMS

ADWF	Average Dry Weather Flow
DEA	Directorate of Environmental Affairs
DWA	Directorate of Water Affairs
EAP	Environmental Assessment Practitioner
ECC	Environmental Clearance Certificate
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental Management Plan
I&AP	Interested and Affected Parties
MAWLR	Ministry of Agriculture Water and Land Reform
MEFT	Ministry of Environment, Forestry and Tourism
MoHSS	Ministry of Health and Social Services
ORC	Omahake Regional Council
WTP:	Wastewater Treatment Plant
DoF:	Directorate of Forestry

LIST OF TABLES

LIST OF FIGURES

EXECUTIVE SUMMARY

The Epukiro POS 3 is small settlement located in Epukiro constituency in Omahake region with a population of about 2000 inhabitants as of 2025. The settlement has a sewage system consisting of pump station and oxidation ponds. However, the existing sewage system is in a poor state, not properly functional and totally overloaded. The poor state of the sewage system is evident from overflow of raw sewage and overgrown vegetation covering the oxidation ponds. The overflow of raw sewage causes environmental challenges and health hazards for humans & livestock alike. As such, the Omaheke Regional Council (ORC) in collaboration with other stakeholders and authorities has proposed to construct new oxidation pond as well as a new 3.5 rising main pipe system.

In terms of the Environmental Management Act (EMA, No.07 of 2007) and regulations (No.03 of February 2012), Construction of industrial and domestic wastewater treatment plants and related pipeline systems may not be carried out without an Environmental Clearance Certificate being obtained. Green Gain Consultants cc has been appointed as an independent Environmental Assessment Practitioner (EAP) to undertake the Environmental Impact Assessment (EIA), prepare the Environmental Management Plan and apply for the Environmental Clearance Certificate for the operation of this project.

The main objective of this EIA is to determine the potential environmental impacts emanating from the construction, operation, maintenance, and decommissioning of the proposed infrastructure. The EIA was conducted in a multidisciplinary approach and followed Namibia's Environmental Assessment process. Relevant environmental data have been sourced from personal observations during site visits as well as from input from NamWater officials, stakeholders, and Interested and Affected Parties (I&APs) as well as a review of relevant literature and legal instruments.

This report constitutes an Environmental Scoping Report which provides information that enables the Department of Water Affairs (DWA) and the Directorate of Environmental Affairs (DEA) to make informed decisions about the project. Moreover, an Environmental Management Plan (EMP) has been prepared, and it should be read in conjunction with this Scoping Report. The EMP will be used as a mitigation tool and an onsite reference document during all phases of the proposed project (planning, construction, operation, and decommissioning).

1. INTRODUCTION

1.1 Context and Background

Due to the poor conditions of the current sewage system, the Omaheke Regional Council in collaboration with other stakeholders are proposing for a new Oxidation ponds and new sewer pipe system in Epukiro POS 3. The oxidation pond is defined as a biological wastewater treatment method using large, shallow ponds where sunlight, algae, and bacteria work together to naturally purify sewage.

In terms of the Environmental Management Act (EMA, No.07 of 2007) and regulations (No.03 of February 2012), Construction of industrial and domestic wastewater treatment plants and related pipeline systems may not be carried out without an Environmental Clearance Certificate being obtained.

Engco Consulting Engineers has appointed Green Gain Environmental Consultant as an independent Environmental Assessment Practitioner (EAP) to undertake the Environmental Impact Assessment (EIA), prepare the Environmental Management Plan (EMP) and apply for the Environmental Clearance Certificate from the Ministry of Environment, Forestry and Tourism (MEFT).

The EAP takes cognizance of the fact that the Environmental Scoping Report and EMP are reviewed by IAPs and also will be independently reviewed by the relevant competent authority; Directorate of Water Affairs (DWA) and by the MEFT. In this way, practical and realistic solutions to potential problems can be identified in a consultative manner where all stakeholders are involved.

1.2 About the EAP

Green Gain Consultants cc is a Namibian based professional environmental and natural resource consulting company established and driven through belief, passion and dedication to sustainable development. Established in 2012, Green Gain has grown into a substantial team of environmental practitioner in Namibia providing innovative and cost-effective solutions to environmental challenges and help our clients meet regulatory and stakeholder expectations for environmental performances. The table below presents detailed information about Green Gain.

Table 1: Details of the EAP

Environmental Assessment Practitioner (EAP): Green Gain Consultants cc	
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Postal address	P.O. Box 5303, Walvis Bay
Contact numbers	0813380114 or 0811422927
Email address	info@greengain.com.na or eap@greengaincom.na
Team Leader	**Name: Mr. J.K. Amushila** **Qualifications:** *M. Sc. Environmental Management, B. Honors Agriculture, B. Degree Agriculture, National Diploma in Agriculture.* **Experience:** He is a registered EAPAN member (No.165) He has worked on a number of projects, including Strategic Environmental Assessments, Environmental Impact Assessments, Environmental Management Plans, and Environmental Auditing. Through his consulting work he gained experience of not only EIA project management, but also environmental specialist experience. (CV attached)

1.3 Purpose of the study

The main aim of this Environmental Impact Assessment (EIA) is to examine both the positive and negative impacts that are associated with the project and thus propose possible mitigation measures. Early identification of possible impacts promotes environmental sustainability as anthropogenic factors are balanced with natural environmental needs.

The aims of this study were to;

- To investigate any environmental and socio-economic impacts associated with this project (both positive and negative).
- To suggest the most suitable mitigation measures so as to reduce the nature and extent of any negative impact associated with this project.
- To investigate the current and pending legal framework to which this project will need to comply,
- Consult all Interested and Affected Parties (I&AP's), with specific emphasis on the residents in the affected area to ensure that their needs and concerns are taken into account; and
- Above all, ensure complies with Environmental Management Act (EMA, 2007)

1.4 Scope of the study

The study used a multidisciplinary approach to establish the baseline situation. The methods used included site screening, surveys, review of different legislation and consultations of Interested and Affected Parties. The study also benefited a great deal from existing information and most importantly from input and contributions submitted by various stakeholders. The Terms of References (ToR) for this study are inferred from the requirements of the Environment Impact Assessment Regulations (Government Notice No 30 of 2012), to enable an application for Environmental Clearance Certificate with the Environmental Commissioner, as required by Section 27(3) of the Environment Management Act (No 7 of 2007).

The study includes a description of the existing biophysical and socio-economic environment affected by the activity and the manner and degree at which the activity may affect the environment was considered. Information pertaining to the receiving environment and its social surroundings has been sourced through baseline site investigations, desktop analysis and spatial analysis by means of Geographic Information Systems (GIS) and Google earth maps.

The following was therefore required as part of the scope of work:

a). Environmental impacts (biophysical)

- Impact on local Ecology
- Impact on surface water and drainage
- Impact on groundwater quality

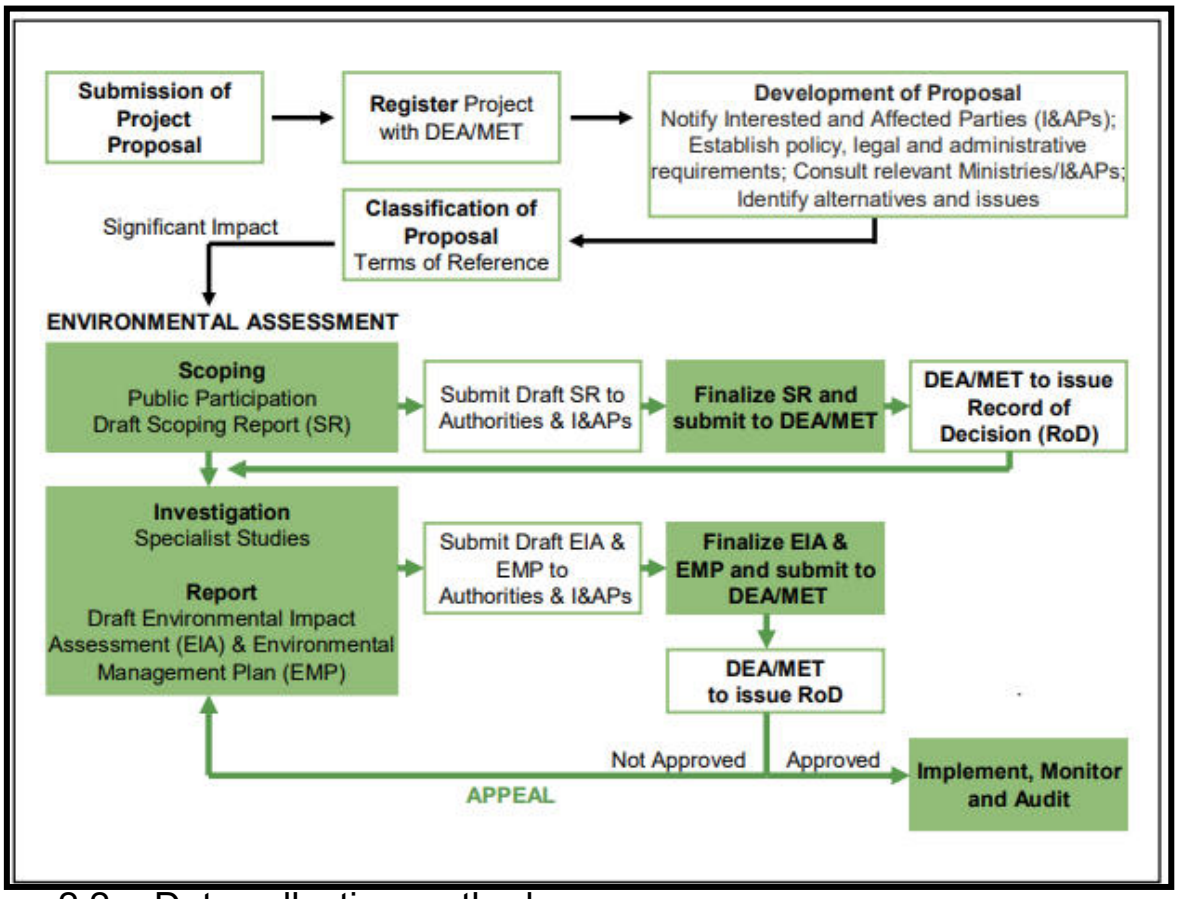
b). Socio-economic impacts

- Impact on the local community and adjacent land uses
- Possible Public Health Impacts
- Biological Hazards
- Ergonomist hazards
- Physical hazards (Safety of the community)

2. APPROACH TO THE STUDY

2.1 Namibian approach

This EIA study was conducted in line with the EIA Regulations (No. 30, February 2012). This draft Scoping report will be shared with the registered I&APs and relevant stakeholders, and will be submitted to the competent authority, and the regulatory authority, for record of decision thereafter.



2.2 Data collection methods

As explained above, a multidisciplinary approach was used during this study in gathering information required for the comprehensive assessment. These include.

- ✓ Site visits to collect primary data
- ✓ Legal and policy review
- ✓ Gleaning over existing information
- ✓ Discussions, meetings and site visits with Authorities
- ✓ Opinions and concerns raised by interested and affected parties.
- ✓ Specialist studies will be conducted to collect detail information for the informed assessment of possible impacts.

3. PUBLIC PARTICIPATION

3.1 Background

Public Participation Process is an integral part of EIA study; thus, it allows for a transparent approach. Different relevant stakeholders and potential Interested and Affected Parties (I& AP) were invited to register and forward concerns / comments to the EIA practitioner in order to ensure equitable and effective participation.

3.2 Consultation

- **Notification of Stakeholders and IAP**

All interested and affected parties were notified through various means such as the Newspaper advertisement that was advertised twice in two local newspapers: *New Era and Confindante* for 17 and 22 October 2025. Several public notices were displayed at public around town and at the project site. These adverts provided brief information about the proposed project and the EIA process.

- **Public meeting**

The public meeting was held on **Thursday 23 October 2025 in Epukiro POS 3, Agriculture Extension Office, from 10:00 am**. The meeting was attended by the Regional Councilor of Epukiro Constituency, representatives from the Traditional Authority and various Government Ministries, members of Epukiro Community Forest as well as residents of Epukiro POS 3 and nearby villages.

During the meeting attendants were introduced to the project and then given a chance to give their views and concerns and explained about their right to participate. Before the meeting, participants also visited the proposed site and the proposed sewage pipe routes.

3.3 Summary of issues from public participation

This section provides a summary of issues and questions raised during the consultation process.

Issue/Question/Suggestions	Response/Comment
-How many jobs will be created during construction?	It is difficult to tell at this stage but looking at the scope of work, it will be between 20 – 30 people
-How new improvements will be made on the proposed oxidation ponds to avoid issues of sewage overflows and reeds/vegetation growing in the ponds?	-The new ponds will be lined with quality materials i.e. HDPE that prevents sewage water flow seeping through and vegetation from growing
Will it be a closed or open system?	-Oxidation ponds are generally open systems
What will the existing Oxidation ponds be used for? Is it possible to use them for rainwater harvesting for the community?	The existing oxidation ponds will be decommissioned. As part of this EIA, we are also investigating the suitable activities for these ponds. Since the oxidation ponds were utilized for hold raw sewage, it is not recommended to be used for harvesting or holding potable water for human or animal consumption. However,
The proposed pipeline is very close to the existing graveyard and this mighty pose risks of gravestone to break during rock breaking, will the contractor take responsibility to repair gravestones if they happened to be damaged during construction?	-The proposed pipeline should be far from the existing graveyard
• The wire fence that is normally used is subject to vandalism and theft, to avoid these, the ORC should consider using alternative fencing material such as brick wall or pallet fence • The pipeline route should be move away from the existing graveyard to avoid breakage of headstones during excavations of the pipe trench • Contractor should be well manged to ensure timely completion of the project • Contractor should be sensitised to employ as many local people as possible • The new oxidation ponds will improve health conditions of the residents and improve the status of the settlement to the net local authority level (Village Council) • The Consulting Engineers (Engco) working on this project should also come make a presentation the community before finalizing the project Design	

4. PROJECT DESCRIPTION

4.1 About the Settlement

Epukiro Pos 3 is located approximately 90 km north-northeast of Gobabis in the Omaheke Region. The settlement consists of six townships and approximately 100 built up houses.

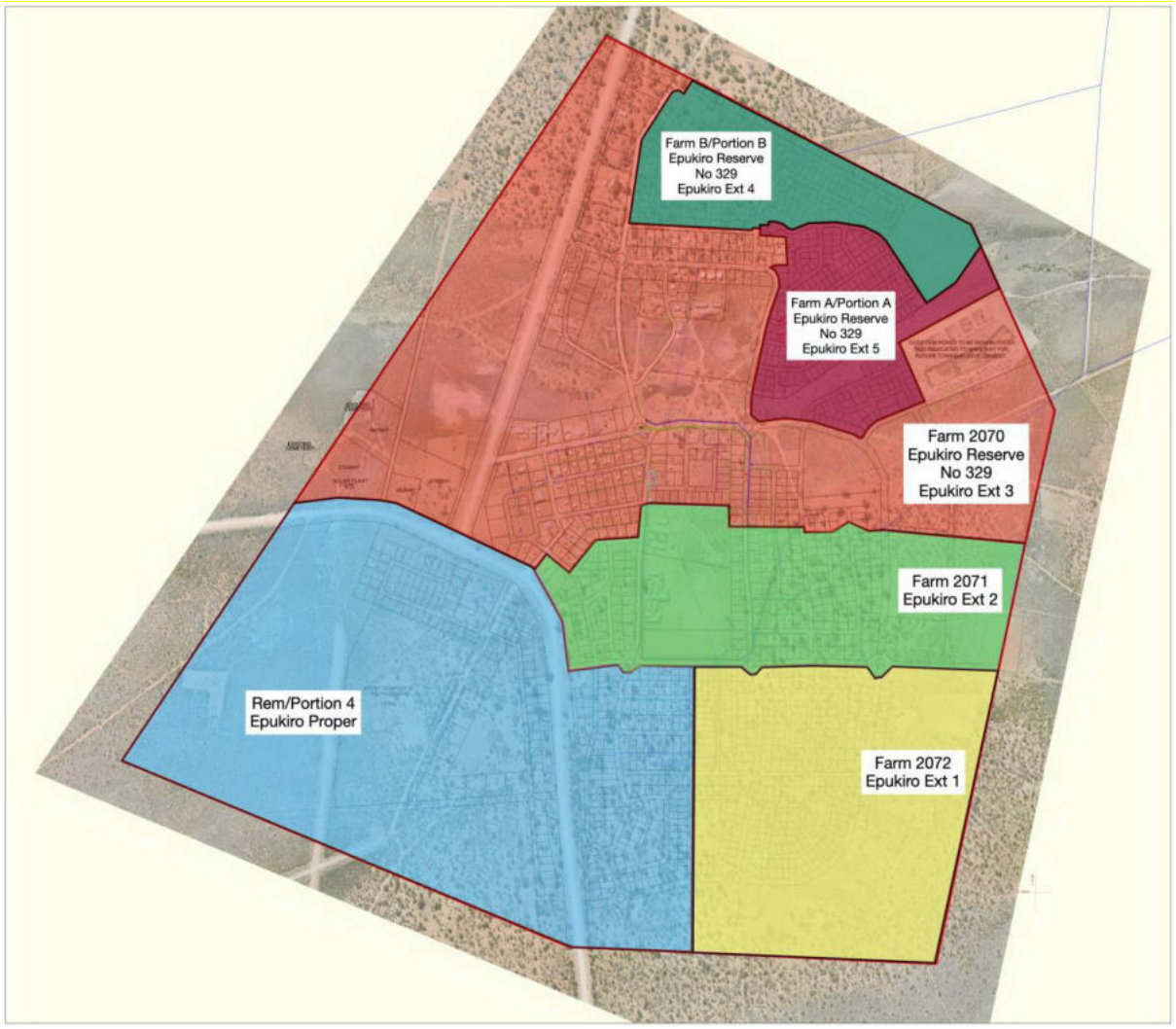


Figure 1: Epukiro POS 3 townlands

The settlement receives water from Namwater through the Epukiro Water Supply Scheme consisting of five boreholes: WW 467, WW 30533, WW 21542, WW 34669, and WW 36704. The boreholes are between 50 m and 181 m deep. The best borehole, WW30533 yielding 4 m^3/h, is situated 2 500 m to the northeast of the settlement. The other boreholes yield between 0.75 m^3/h and 3 m^3/h.

4.2 Current system

The current sewage system consists of a pump station and 8 oxidation ponds which are located few distances east of the town.

Figure 2: Locality map of the existing ponds

The sewage generated originates mainly from households, institutions and businesses. The sewage stabilization process consists largely of the interactions of bacteria and algae. Bacteria digest and oxidize the constituents of sewage and render it harmless and odor free.

The existing sewage system is in a poor state, not properly functional and totally overloaded. The poor state of the sewage system is evident from overflow of raw sewage and overgrown vegetation covering the oxidation ponds.

Figure 3: Existing situation

4.3 The proposed Sewage System

4.3.1 Locality

The proposed oxidation ponds are to be located about 2.5 km west of the town on the following coordinates -*21.5962" S and 19.425108" E*

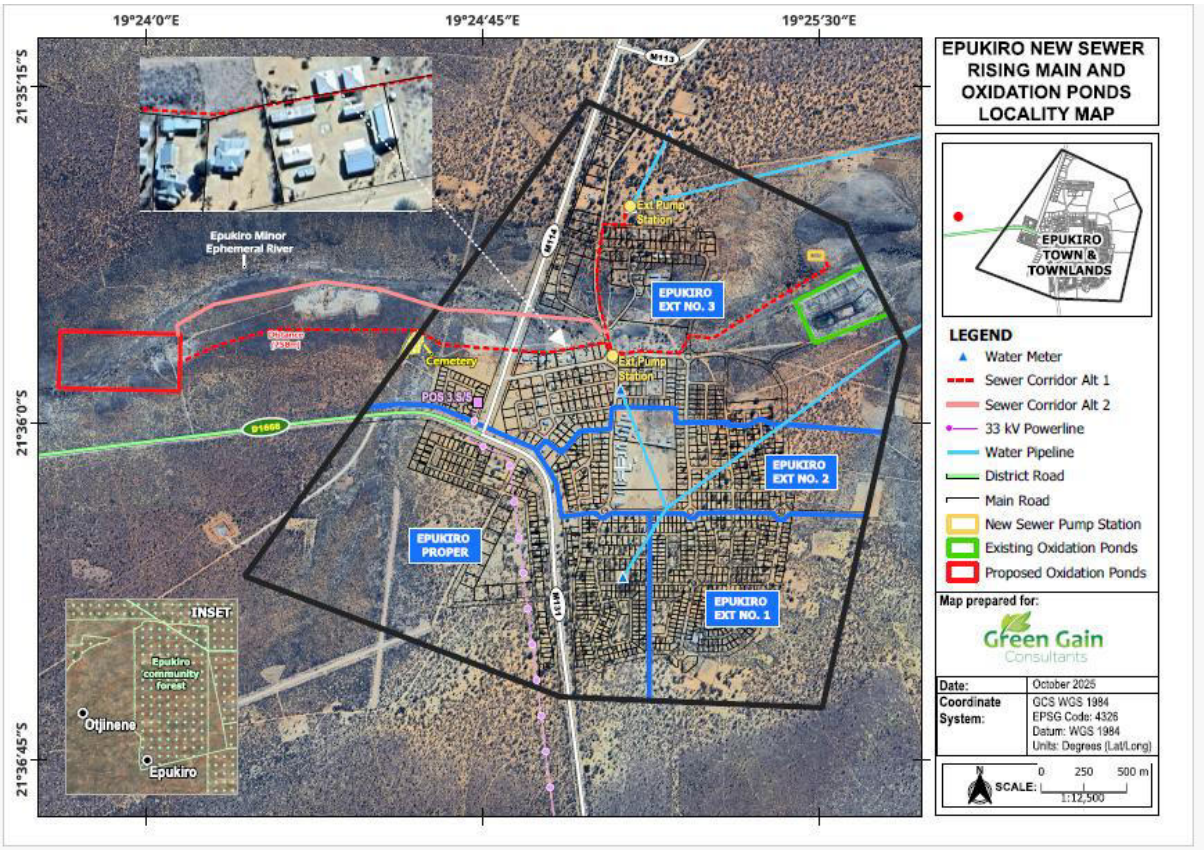


Figure 4: Locality map

4.3.2 Fundamental Design concept

The proposed Oxidation ponds will be designed in such a way to accommodate the sewer from all development and residential areas in the town. The estimated capacity of system will be 140 m^3 per day. The diagram below represents the process at the typical Oxidation Ponds System.

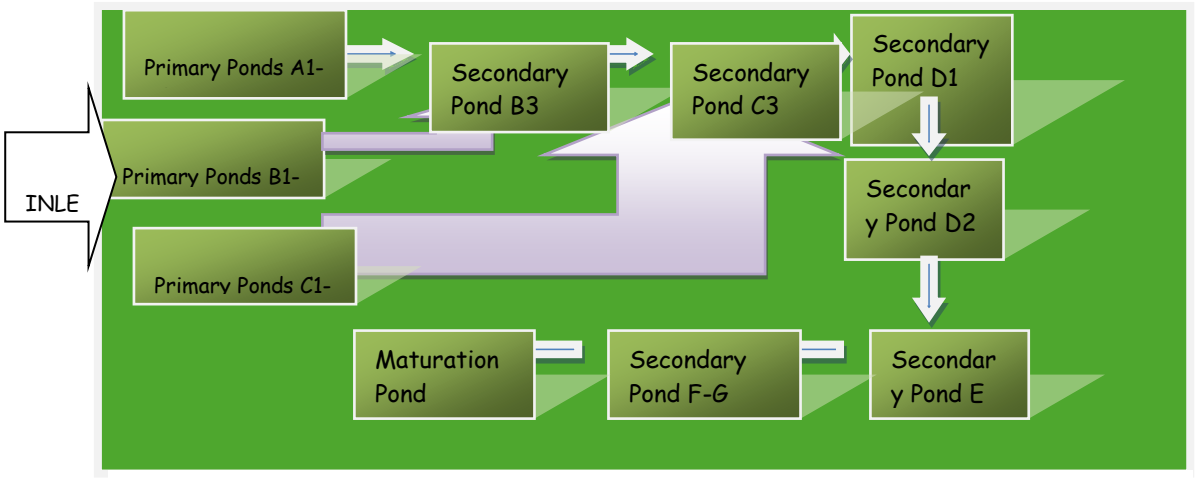


Figure 5: Typical oxidation ponds flow chart

i). Pretreatment

Before entering the oxidation pond, wastewater undergoes basic physical treatment to protect the pond's efficiency. The sewage from the residential areas passes through a screening mechanism linked to the oxidation ponds. After screening, the wastewater is discharged into a manhole close to the ponds from where the direct flow gauging commences. No storm water drains into the system.

ii). Biological treatment flow stages

The main configurations of pond systems are:

- Facultative pond only;
- Anaerobic pond followed by a facultative pond;
- Facultative pond followed by maturation ponds in series;
- Anaerobic pond followed by a facultative pond followed by maturation ponds in series

<u>Primary ponds</u>

The primary ponds also referred to as Anaerobic ponds receive raw wastewater. They usually have a smaller surface area compared to facultative ponds and are also deeper (usually 3.0 to 5.0 m). Sludge accumulates at the bottom of the anaerobic ponds and needs to be removed every few years. Depending on loading and climatic conditions, these ponds are able to remove between half to two thirds of the influent BOD. Anaerobic stabilization ponds have the disadvantage of potentially releasing malodorous gases, especially if the system has operational problems.

Facultative ponds

Facultative stabilization ponds that receive raw wastewater are called primary facultative ponds. Compared with anaerobic ponds, facultative ponds are shallower (1.5 to 2.5 m deep) and have much larger surface areas. The sludge comprising the sediment layer in the pond undergoes anaerobic digestion and may accumulate for several years without needing removal.

Maturation ponds

These ponds are only included in the treatment line when high efficiencies of pathogen removal are required, either for discharge of the treated effluent in surface water bodies, or for use for irrigation or aquaculture. Maturation ponds must be shallow (around 1.0 m depth or less) with a great surface area so that more oxygen can dissolve into the water giving the bacteria enough oxygen to properly function. Maturation ponds may be used in combination with a rainwater reservoir to form an ecological, self-purifying irrigation reservoir

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4.3.3 Proposed pipeline routes

In line with the Environmental Impact Assessment Regulations, two alternative routes were considered for the proposed sewer rising main pipeline. The proposed pipeline will be made of a 160mm uPVC material and will be underground about 1.2 to 1. 4 meter deep.

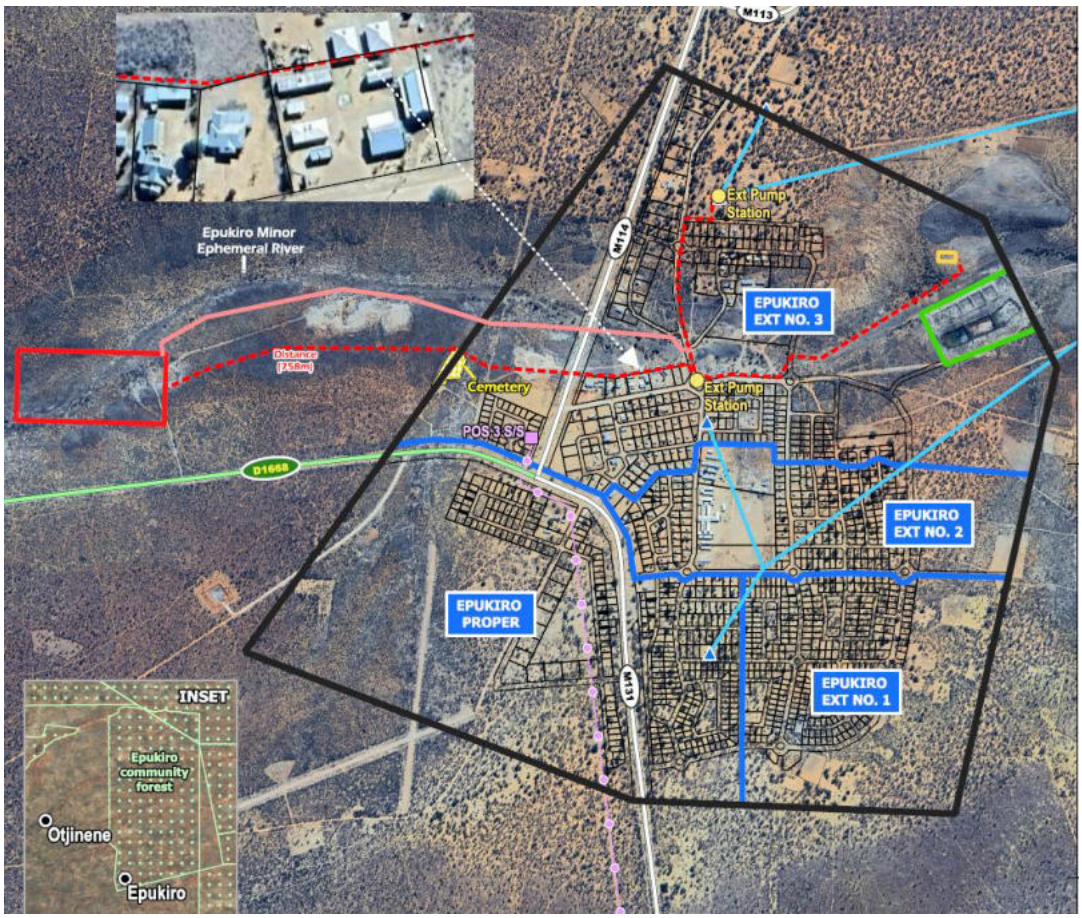

Figure 6: Proposed new Sewer pipeline routes

Route 1 (Red)

The proposed route 1 measures approximately 2.6 km from the pump station to the proposed new oxidation pond site. The pipeline passes through edges of existing properties, crosses the road (M114) and runs straight to the oxidation pond site. The proposed route runs about 1.5 to 2 meters north of the existing graveyard.

Route 2

The proposed route 2 measures also taking off from the existing pump station, cross over M114 road and follows more less the same pattern as alternative 2 but stretches far away from the existing graveyards, running closer to the riverbed (*omuramba*) and made a turn into the proposed pond site.

4.3.4 Operation and Maintenance

Regarding operation and maintenance, the tasks performed by the operational staff are very simple and do not require special skills. Additionally, there is no energy consumption for aeration, no need for heavy equipment maintenance and no frequent sludge removal, sludge treatment and disposal.

Ponds require very little maintenance, since there is no heavy electric or mechanical equipment that requires attention. The only routine maintenance needed is on the preliminary treatment (cleaning of screens and removal of sand), routine checking of pipes, weirs and other hydraulic structures, and removal of unwanted vegetation growth in embankments.

Sludge accumulates inside the ponds. It needs to be removed only in the interval of several years. This is an important advantage of the system. However, when removal is necessary, it is usually an expensive and labor-intensive operation. Removal is more frequent in anaerobic ponds (every few years), because of their smaller volume and lower capacity to store the sludge, compared with facultative ponds. In facultative ponds, sludge removal may be necessary only in intervals around 15 to 25 years. In maturation ponds, sludge accumulation is very low.

Sludge removal, also called desludging, may be done in two basic ways: (i) interrupting the operation of the pond for desludging or (ii) keeping the pond in operation while desludging. In the first case, the influent wastewater to the pond to be desludged is closed. Afterwards, the pond is drained, and the bottom sludge is left for open drying for several weeks. During this period, the wastewater to be treated needs to be diverted to other ponds in the system. After the sludge has dried, its removal may be done manually (very laborious in large ponds) or mechanically using tractors or mechanical scrapers.

In the second alternative, when the pond is left in operation during desludging, the removed sludge will be wet and will require further drying. This is undertaken outside the pond. Sludge removal can be by suction and pumping using vacuum trucks (only for small ponds), dredging, pumping from a raft or involving other mechanical equipment. In either case, the amount of sludge to be removed is very high, considering its accumulation over a period of years. This process is very laborious, expensive and requires careful planning.

4.4 The need desirability

The construction of sewage systems for any town is a fundamental component of sustainable urban planning, ensuring long-term ecological health and community well-being. The need and desirability for the proposed new oxidation ponds and sewage pipe system in Epukiro POS 3 is based on the following facts.

- **Public Health:** Untreated sewage contains harmful pathogens, bacteria, and viruses (such as those causing cholera, typhoid, and hepatitis) that pose severe health risks. The new sewage system will safely remove these wastes, protecting the community from waterborne diseases and improving overall sanitation standards.

- **Environmental Protection:** The overflows or direct discharge of untreated sewage into the open environment or in the ground will contaminates these vital water bodies, harms aquatic ecosystems, and can create 'dead zones' due to oxygen depletion. The proposed new sewage system will ensure contaminants are removed before treated water is returned to the environment or reused.

- **Regulatory Compliance:** There are various legal frameworks that regulates wastewater treatment, pubic and environmental health. The proposed new sewage system will allow the ORC to comply with these legal frameworks and helps to avoid legal issues, hefty fines, and potential lawsuits.

- **Aesthetic and Quality of Life:** Untreated sewage can lead to foul odors and unsanitary conditions, degrading the quality of life for residents. The proposed sewage system will enhance the overall attractiveness and liveability of the community of Epukiro POS 3.

5. THE AFFECTED ENVIRONMENT

This section provides a brief description of the existing biophysical and socio-economic environments of the study area. It draws on information from site visits, the study team and member's experiences, background literature as well as maps and photographs.

5.1 Description of Biophysical Environment

- **Climate overview (Regional)**

The Epukiro area is situated in the western central part of Namibia which is classified as Kalahari. Mostly summer rain is experienced in this area. The average annual rainfall for Epukiro and surroundings is 350 – 400 mm, while the average evaporation rate is in the region of 1900 – 2,100 mm a year (Mendelsohn, et al, 2009). It is obvious that evaporation exceeds rainfall by far, resulting in a water deficit, both on a month-to-month and annual basis.

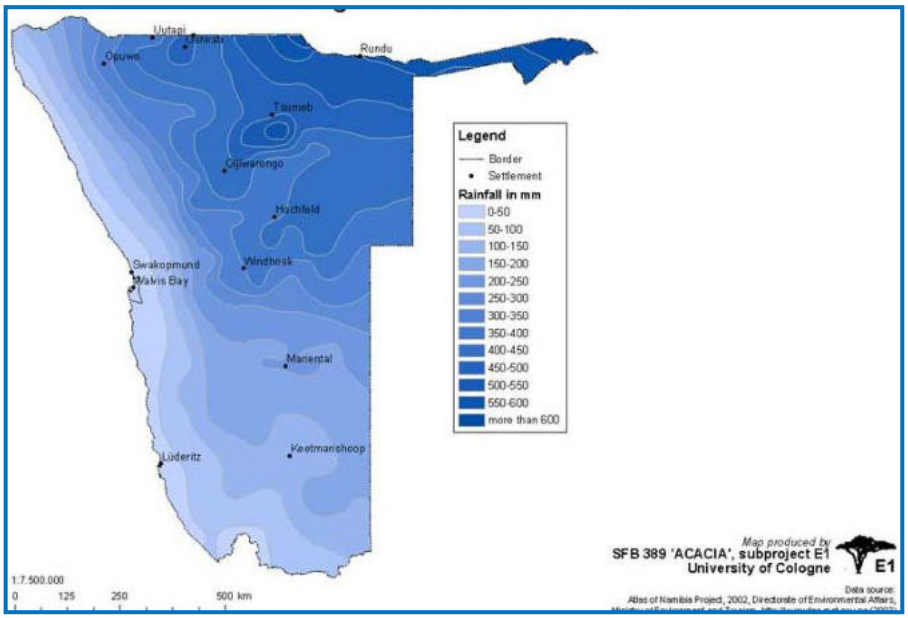

Figure 7: Climatic map of Namibia

During winter months the average minimum temperature is less than 2-4ºC, while the average maximum day temperature during summer is 32-34ºC (Mendelsohn, et al, 2009). Southerly to south-westerly winds dominate throughout the year causing wind erosion where soil cover is low. Average wind speeds are rarely higher than 5m/s. Given the nature of the development, it is not expected that the climate will have any significant effect and vice versa. Winds may contribute to dust and noise nuisance, having a potential negative implication on the surrounding residential areas.

- **Topography and elevation of the area**

The Epukiro area is characterised by a flat, sandy landscape within the wider region known as the Sandveld, which forms part of the western edge of the Kalahari Desert basin. The general elevation of the settlement of Epukiro is approximately 1,461 meters (4,793 ft) above sea level.

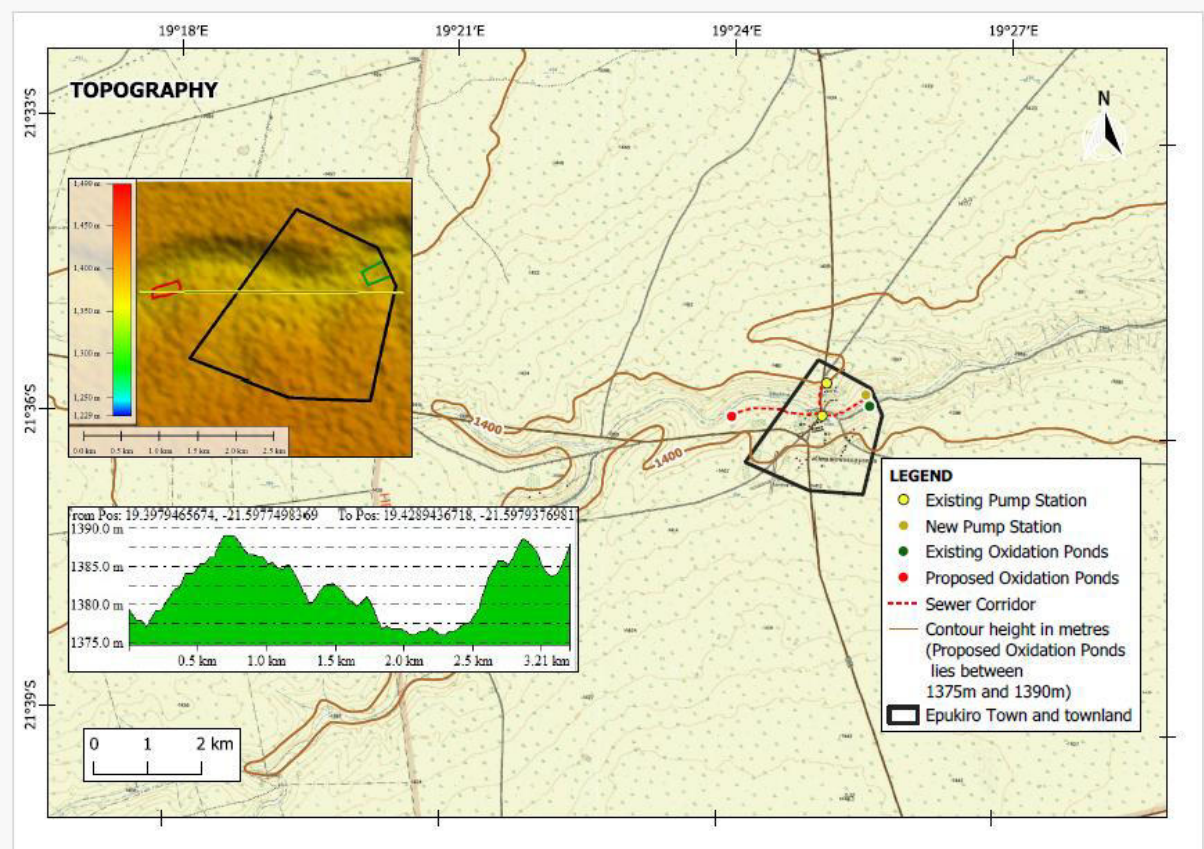

Figure 8: Topographic map of Epukiro POS 3

The area is typically characterised by dry riverbeds/drainage lines that runs-off for short periods during the rainy season, locally known as *omurambas*, traverse the region, including the Epukiro omuramba which generally drains eastward. Groundwater is generally available throughout the area, with higher-yielding aquifers in some specific localities like the Eiseb area.

- **Soil and Geology**

The topography of the majority of the project site consists of flat Kalahari Plains of white reddish sandy soils which also dominate the surface area of the region. Consequently, Omaheke Region leis on the western edge of a vast basin of sand.

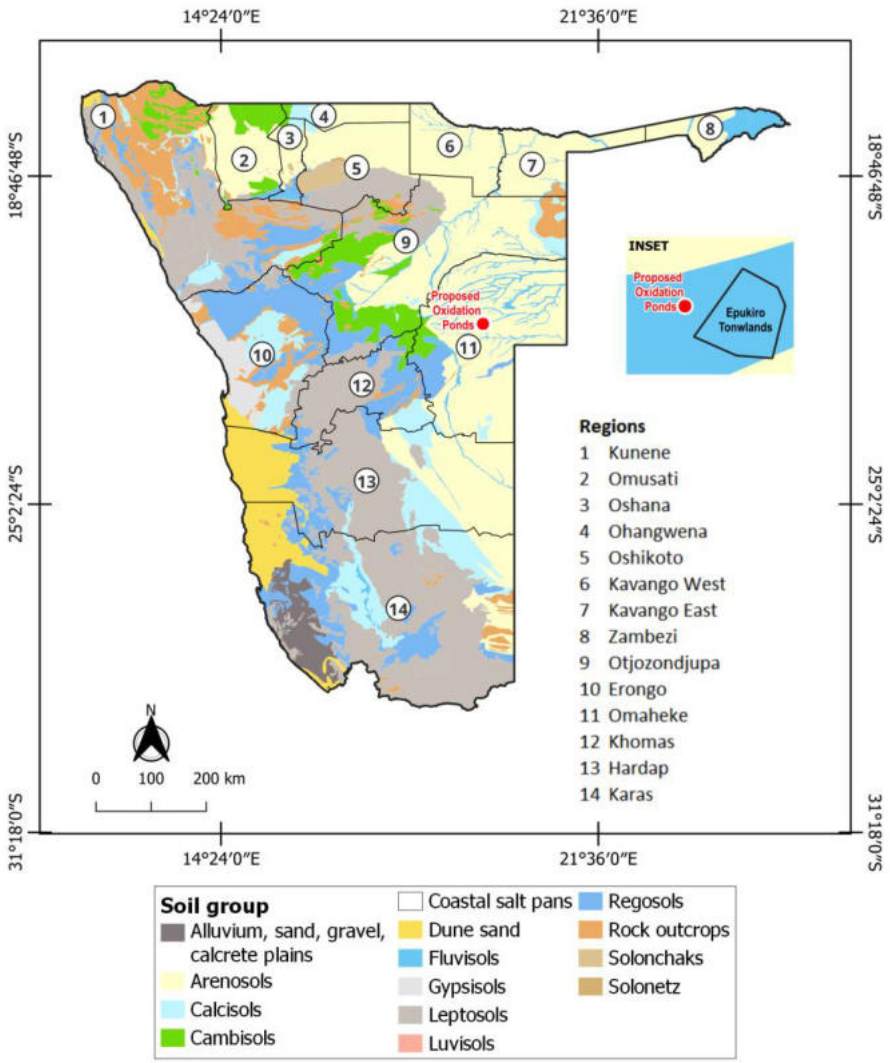

Figure 9: Soil Map of Namibia

Omaheke Region is geologically part of a large basin that is filled with layers of Kalahari group material. Bedrock material underneath comprises Archean Basement, Damara supergroup, Karoo supergroup and igneous Post Karoo Lithologies. The deep cover of all Kalahari group sediments largely conceals all bedrock formation and information on bedrock lithologies is based and isolated outcrop exposure.

- **Hydrogeology**

Geogically, the Omaheke Region is part of a large basin that is filled with layers of Kalahari group material. Bedrock material underneath comprises Archean Basement, Damara supergroup, Karoo supergroup and igneous Post Karoo Lithologies.

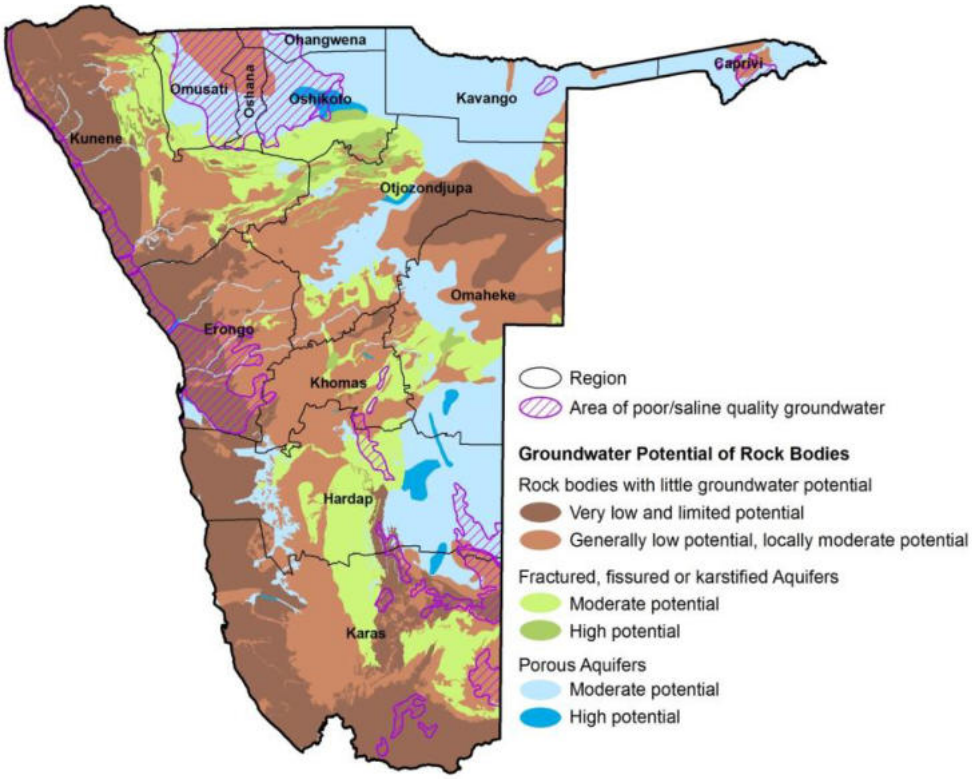

Figure 10: hydrogeology map of Namibia

Limited volumes of groundwater are available in the basement rocks of the Omaheke Region, since there are no productive aquifers. Lack of recharge and poor groundwater quality in most areas further aggravates the situation. However, groundwater is one of the most important resources, especially in the arid climate of Namibia and the protection thereof should be regarded as a high priority.

- **Flora and fauna**

Epukiro falls within the Tree and Shrub Savanna Biome of Namibia which is recorded to have a main type of Vegetation namely the central Kalahari Shrubland. This vegetation is characterized low shrubs and grasslands. (Loots, 2019). The landscape features savanna vegetation, ranging from open savanna to bush and acacia scrub. Bush encroachment is a noticeable issue in some farming areas. Forest and woodland savannahs of the northern Kalahari, camel thorn savannahs of the central Kalahari and mixed shrub vegetation of the southern Kalahari are the region's dominant vegetation zones (Mendelsohn *et al*., 2009).

Figure 11: Vegetation of Epukiro POS 3

The area also falls within the gazetted Epukiro Community Forests which is managed jointly by the Directorate of Forestry (DoF) and the Community.

The area of Epukiro hosts a variety of large to small fauna, ranging from Kudu (*Tragelaphus strepsiceros*), springbok (*Antidorcas marsupialis*), gemsbok (*Oryx gazella*), Damara dik-diks (*Madoqua kirkii*), and black-faced impala (*Aepyceros melampus petersi*), leopard (*Panthera pardus*), cheetah (*Acinonyx jubatus*), bat-eared fox (*Otocyon megalotis*) and Cape fox (*Vulpes)* The main farming activities that are occurring within the Epukiro town and on surrounding properties are cattle and goat farming.

5.2 Socio-economic profile of Epukiro

- **Demography**

Epukiro is a cluster of populated places in the remote eastern part of the Omaheke region with an estimated population of 6,106 inhabitants as of the 2020 census. Epukiro is inhabited by Tswana, Ovambanderu, and San people. A significant portion of household heads in the eastern communal areas have no formal education (over 50%). Epukiro POS 3, also called Omauezonjanda is one of the largest centers of the larger Epukiro area.

- **Public Services**

Epukiro Post 3 settlement has basic facilities including a filling station, post office, auction pen, butcheries, and a few general dealers. There is also a constituency office, a government clinic, and a secondary school. However, the clinic lacks an ambulance and a mortuary, and many schools struggle with inadequate infrastructure and learning materials.

- **Local Economic Development context**

Epukiro is situated on the national road C22, but most roads connecting it to other settlements like Gam and Okatumba are untarred and in poor condition, hindering transportation of goods to markets.

The area is underdeveloped with limited access to safe water and sanitation facilities. While a majority of the broader Omaheke region has access to clean drinking water (89.8% as of 2023), only 42.1% have access to toilet facilities.

The economy is dominated by farming with cattle and goats. Epukiro is considered one of the mainstays of Namibia's red meat industry, though farmers often receive low prices for their livestock. Apart from farming, major sources of cash income for households include pensions and government wage employment in local institutions like the Ministries of Agriculture, Water and Forestry, and Gender Equality. The sale of animals is the main source of income for over 40% of households in the eastern communal areas.

6. LEGAL FRAMEWORK

6.1 Environmental requirements

The proposed activities (construction, operation, maintenance, and decommissioning of the proposed Aroab Scheme extension and upgrade) will trigger activities listed under the Environmental Management Act No. 7 of 2007 and the EIA Regulations (No. 03 of February 2012) as follows:

Proposed project activities	Activities triggered	
	Category	**Specific activity**
• **Construction of new Wastewater treatment plant**	No. 8 Water Resource Developments	8.6 Construction of industrial and domestic wastewater treatment plants and related pipeline systems
• **Storage of chemicals (Chlorine gas or HTH) for treatment purposes**	N0.9 Hazardous Substance treatment, handling, and storage	9.1 The storage of a hazardous substance defined in the Hazardous Substance Ordinance 1974

6.2 Applicable legislation

In addition to assessing the possible impacts of the project to the environment, it is also required by the EMA that assessment do take into consideration a number of significant pieces of environmental legislation that the project needs to comply with. The list of applicable legislation is presented in the Table below.

Table 2: Applicable National Legislation

LEGISLATION	PROVISION and Project implication	Project implications
Constitution of the Republic of Namibia (1990)	Articles 91 (c) commands the state to actively promote and sustain the environmental welfare of the nation by formulating and institutionalizing policies to accomplish the sustainable objectives which include: • Guarding against overutilization of biological natural resources, • Limiting over-exploitation of non-renewable resources, • Ensuring ecosystem functionality, • Protecting Namibia's sense of place and character. • Maintain biological diversity. • Pursuing sustainable natural resource use. Article 95 (l) recites: "The State shall actively promote… maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future". Furthermore, Artic 95 (l) ensures that workers are paid a living wage adequate for the maintenance of a decent standard of living and the enjoyment of social and cultural opportunities.	Through the implementation of the EMP, the proponent shall be advocating for sound environmental management as set out in the Constitution.

Environmental Management Act (EMA), Act No. 7 of 2007.	-Ensuring that the significant effects of activities on the environment are considered carefully and in time. -To promote the sustainable management of the environment and the use of natural resources by establishing principles for decision making on matters affecting the environment.	An EIA has been undertaken and ECC will be applied for the proposed project.
Water Supply and Sanitation Sector Policy, 2008	-Enforces the sustainable development and efficient utilization of water resources. -To improve access to safe water for communities in rural, communal areas. - Make sure the provision of sanitation should contribute to improved health, ensure a hygienic environment, protect water sources from pollution, promote water conservation and stimulate economic development	The proposed works are aimed at ensuring proper management of wastewater
Water Resources Management Act 11 of 2013.	To provide for the management, protection, development, use, and conservation of water resources; to provide for the regulation and monitoring of water services and to provide for incidental matters. This Act has been passed by Parliament, but it is not enforced yet. It will be enforced once a date is set by the Minister in the Government Gazette. The Regulations of the WRMA also outlined the water quality guidelines and standards for potable water specified in Table 1 to Table 3 of the WRMA.	Treated effluent should meet the discharge standards as prescribed in the WRA Regulations.
Sewerage and Drainage Regulations (amendments) Local authorities by-law	Affords the prevention of pollution and environmental damage caused by the improper construction of sewerage and water pipelines in drainage lines.	All infrastructure of the new WTP should be of the required engineering standards
Public and Environmental Health Act, 2015	The objectives of the PHE Act are to; • Promote public health and wellbeing.	Ensure the new WTP is operated in a manner that to

	• Prevent injuries, diseases and disabilities • Protect individuals and communities from public health risks • Encourage community participation in order to create a healthy environment • Provide for early detection of diseases and public health risks	prevent safety, health and environmental risks.
Labour Act (No 11 of 2007)	To establish a comprehensive labour law for all employers and employees; to entrench fundamental labour rights and protections. Regulate basic terms and conditions of employment; ensure the health, safety and welfare of employees; to protect employees from unfair labour practices; to regulate the registration of trade unions and employers' organisations; to regulate collective labour relations; to provide or the systematic prevention and resolution of labour disputes;	All Labour related issues should be handled according to the Act
Employment Service Act no. 08 of 2011	To provide for the establishment of the National Employment Service; to impose reporting and other obligations on certain employers and institutions; to provide for the licensure and regulation of private employment agencies; and to deal with matters incidental thereto.	Employment conditions during construction and operation phases should be handled in accordance with the Employment scheme.

7. ANTICIPATED IMPACTS

7.1 Introduction

The EIA of the project activities is determined by identifying the environmental aspects and then undertaking an environmental risk assessment to determine the significant environmental aspects. The term “environment” is used to describe the total integrated environment, which includes aspects of the natural, economic, and social environment.

In assessing the impact of the proposed development, four rating scales were considered. Each issue identified was evaluated in terms of the most important parameter applicable to environmental management. These include the extent, intensity, probability, and significance of the possible impact on the environment and whether such effects are positive (beneficial) or negative (detrimental). The rating scales used are as follows.

Table 3: Impact rating scales

CRITERIA	DESCRIPTION			
EXTENT	**National (4)** The whole country	**Regional (3)** Omaheke Region and neighbouring regions	**Local (2)** Within a radius of 2 km of the development site.	**Site (1)** Within the development site
DURATION	**Permanent (4)** Mitigation either by man or natural process will not occur in such a way or such a period that the impact can be considered transient	**Long-term (3)** The impact will continue/last for the entire operational life of the development but will be mitigated by direct human action or by natural processes thereafter.	**Medium-term (2)** The impact will last for the period of the project phase, whereafter it will be entirely negated	**Short-term (1)** The impact will either disappear with mitigation or will be mitigated through a natural process in a span shorter than the construction phase
INTENSITY	**Very High (4)** Natural, cultural, and social functions and processes are altered to extent that they permanently cease	**High (3)** Natural, cultural, and social functions and processes are altered to extent that they temporarily cease	**Moderate (2)** The affected environment is altered, but natural, cultural, and social functions and processes continue albeit in a modified way	**Low (1)** The impact affects the environment in such a way that natural, cultural, and social functions and processes are not affected
PROBABILITY	**Definite (4)** The impact will certainly occur	**Highly Probable (3)** Most likely that the impact will occur	**Possible (2)** The impact may occur	**Improbable (1)** The likelihood of the impact materializing is very low
SIGNIFICANCE	Is determined through a synthesis of impact characteristics. Significance is also an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.			

Table 4: Description of the significance of impacts

Low impact	A low impact has no permanent impact of significance. Mitigation measures are feasible and are readily instituted as part of a standing design, construction, or operating procedure.
Medium impact	Mitigation is possible with additional design and construction inputs.
High impact	The design of the site may be affected. Mitigation and possible remediation are needed during the construction and/or operational phases. The effects of the impact may affect the broader environment.
Very high impact	Permanent and important impacts. The design of the site may be affected. Intensive remediation is needed during construction and/or operational phases. Any activity which results in a "very high impact" is likely to be a fatal flaw.
Status	Denotes the perceived effect of the impact on the affected area.
Positive (+)	Beneficial impact
Negative (-)	Deleterious or adverse impact.
Neutral (/)	The impact is neither beneficial nor adverse
It is important to note that the status of an impact is assigned based on the status quo. Therefore, not all negative impacts are equally significant.	
Significance Rating Scale Points 1-4 Insignificant/low Points 5-8 Significant /Moderate Points 9-12 Very significant/High. Points 13-16 Highly significant /Very high	

The significance of each impact has been rated before and after mitigations measures. The implementation of mitigations is expected to reduce the significance of impacts using at least two (2) scales.

7.2 Potential Impacts During Planning and Design Phase

The first step in avoiding and preventing any possible negative impacts during the construction, operation, maintenance, and decommissioning phase, should start with the planning and designing phase. Below are issues that should be considered during the planning and design phase.

- Sewer pipeline routes (Alternative 2)
- Provision for lining of the ponds
- Correct depths for different pond systems (Anaerobic, facultative and maturation ponds)
- Proposed sewer pipe materials and different pipeline sections (Road crossing, river crossing etc)

7.3 Potential Impacts During Construction Phase

The anticipated negative impacts during the construction phase of the proposed wastewater treatment plant will affect both the biophysical and socio-economic settings of the receiving environments as explained below.

a) Negative impacts on the natural environment

- Vegetation clearance
- Disturbance to local fauna
- Soil contamination
- Dust and air pollution
- Waste generation
- Risks of groundwater contamination

b) Negative impacts on the socio-economic environment.

- Impacts to adjacent land users
- Public Health and Safety impacts
- Occupational health and safety hazards
- Impacts of laydown areas, and temporary camps
- Visual and aesthetic impacts

Table 5: Potential Impacts during Construction phase

Potential Impacts	Ratings (before mitigation/measures)				Significance		Mitigation measures
	Extent	Duration	Intensity	Probability	Without measures	With measures	
Vegetation clearance Construction of the new oxidation ponds and sewer pipeline will result in clearance of local vegetation, including some protected species.	*1*	*1*	*1*	*1*	*4*	*2*	✓ Only vegetation directly affected by the construction activities may be cleared. ✓ Contact DoF before removing any protected species (See Section 3 for the list of protected species that could occur in the area).
Disturbance to local fauna Construction activities have potential to cause disturbances to the local occurring fauna i.e. domestic animals, ground-burrowing animals	*1*	*1*	*1*	*1*	*4*	*2*	✓ The construction site for the oxidation ponds must be fenced off, to limit disturbances to the construction site. ✓ Excavating trenches in few distances are enough to be worked for a week. Do not leave trenches open for too long.
Soil contamination Contamination of soil may occur as a result of leaks and spills from construction vehicles and equipment	*1*	*1*	*1*	*1*	*4*	*4*	✓ Vehicles with leaks should be fitted with drip trays. ✓ Contaminated sand must be removed and disposed of as hazardous waste.

Dust and Noise To be generated from demolishing works might constitute a nuisance. This will be limited to the project site.	*1*	*1*	*1*	*1*	*4*	*4*	✓ Work should be limited to daytime hours. ✓ Provide measures to control dust and noise.
Waste generation The activities will generate different types of waste.	*1*	*1*	*1*	*2*	*5*	*3*	✓ Building rubble and other general waste should be disposed of appropriately at the disposal site. ✓ Steel and metals should be taken to local Scrapyards in the nearest town if any.
Risks of groundwater contamination Groundwater contamination may occur through the contamination of topsoil or through direct contamination from spills	*1*	*1*	*1*	*1*	*4*	*2*	✓ Spills and leaks should be contained and contaminated sand should be cleaned up and disposed of at the disposal site.
Public health and safety impacts The safety of the community living in proximity to the site and the employees could be compromised by workplace hazards.	*1*	*1*	*1*	*1*	*4*	*2*	✓ Erect warning signs at the construction work site. ✓ The site should be fenced off and out of bounds. ✓ Prohibition and access restricted signs should be displaced at the site.
Occupational health and safety hazards Construction activities are associated with numerous health and safety risks. The risks can be	*1*	*1*	*1*	*1*	*4*	*2*	✓ All employees should receive training in their respective jobs. ✓ All employees should be equipped with

aggravated by lack of know-how or skills.							appropriate Personal Protective Equipment (PPE). ✓ There should be a safety representative for the construction workers
Impacts of laydown areas, and temporary camps The placement of temporary construction camps and workshop is very crucial, as poorly placed camps could result in various environmental and land use impacts.	*1*	*1*	*1*	*2*	*5*	*3*	✓ Temporary construction camos should be placed in areas approved by the ORC and should be fitted with sufficient ablution facilities.
Visual and aesthetic impacts Visual intrusion may occur from construction camps, waste (litters)	*1*	*1*	*1*	*1*	*4*	*2*	✓ The construction site should be always kept clean and tidy. ✓ Cement should be mixed in enclosed areas.

7.4 Potential Impacts During Operation and Maintenance Phase

The anticipated negative impacts during the construction phase of the proposed above and below ground pipelines will affect both the biophysical and socio-economic settings of the receiving environments as explained below.

c) Negative impacts on the natural environment

- Potential contamination of the environment (surface water, soil)
- Waste generation
- Risks of groundwater contamination

d) Negative impacts on the socio-economic environment.

- Land use effects
- Public health and Safety impacts
- Smells and Odor
- Occupational health and safety hazards

Table 6: Potential Impacts During Operation and Maintenance Phase

Potential Impacts	Ratings (before mitigation/measures)				Significance		Mitigation measures
	Extent	Duration	Intensity	Probability	Without measures	With measures	
Potential contamination of the environment Contamination of the environment may occur as result of overflows of untreated or partially treated wastewater into the ground and surrounding surface or groundwater sources. This can introduce high levels of pathogens (like E. coli), organic matter (BOD - Biochemical Oxygen Demand), and nutrients (nitrates and phosphates) into local water bodies, leading to significant pollution. Oxidation ponds may not effectively remove heavy metals, which can accumulate in the sludge or be discharged into receiving waters, posing a risk to aquatic life and potentially entering the human food chain if downstream water is used for domestic or agricultural purposes.	*1*	*2*	*2*	*1*	*6*	*4*	✓ Construct contoured walls or stormwater channels around the ponds to prevent stormwater from mixing with sewage. ✓ There must be a proper emergency plan to deal with uncertainties that may occur ✓ All oxidation ponds must be lined with GSE leak control Geomembranes. ✓ Only effluent treated at the required standard should be discharged into the environment. ✓ Final effluent should not be discharged or allowed to flow into the environment. Only effluent of required standards may be used for irrigation purposes subject to approval of MAWLR.

Impact on Fauna and Flora: The toxic nature of the wastewater can cause mortality or affect the movement and diversity of aquatic organisms and migratory birds that might be attracted to the pond.	*1*	*1*	*1*	*1*	*4*	*2*	✓
Land Use effects The oxidation pond is located outside the settlement boundary and is within the gazetted Community Forest of Epukiro.	*1*	*1*	*1*	*1*	*4*	*2*	✓ At present there are no objections submitted regarding the location. ✓ The pipeline route should be far from the existing properties and the graveyard. ✓ Obtain consent (in writing) from the Ovambanderu Traditional Authority on the acquisition of the land for the oxidation ponds. ✓ Consult DoF and Community Forest before construction.

Waste generation The operation of the oxidation ponds will generate different types of waste from sewage screening, sludge as well maintenance and repair works.	*2*	*1*	*1*	*2*	*6*	*4*	✓ All general waste should be collected regularly and disposed of at the disposal site. ✓ Ponds should be cleared of dry sludge regularly. Sludge should be disposed of at the dumpsite. ✓ Hazardous waste (if any) should be disposed of separately Windhoek hazardous landfill site.
Air Quality and Odor: Anaerobic conditions, especially during the night or if the pond is overloaded, can lead to the production and release of odorous gases like hydrogen sulfide	*2*	*1*	*1*	*2*	*6*	*4*	✓ Ensure proper maintenance which includes screening of raw sewage, control of scum and removal of excess vegetation in the ponds.
Public health and Safety impacts The presence of open ponds may pose safety and health risks to the public. Ponds can become breeding grounds for disease vectors, such as mosquitoes, which poses a risk to public health in nearby communities.	*1*	*1*	*1*	*1*	*4*	*2*	✓ The site should be enclosed with a high fence (1.8meter) with lockable gates. ✓ Prohibition and access restricted signs should be displaced at the site. ✓ Erect weatherproof signs around the site indicate

							that the effluent water is not suitable for human consumption.
Occupational health and safety hazards The operation of the new oxidation ponds can give rise to a number of occupational heath and safety risks	*1*	*1*	*1*	*1*	*4*	*2*	✓ Employees should receive training with regards to the job and potential risks ✓ Employees should be provide with appropriate PPE.

8. RECOMMENDATIONS AND CONCLUSION

The objective of the Scoping Phase was to establish the baseline of the proposed development and to solicit input from stakeholders and Interested and Affected parties to define the range of the impact assessment and determine the need to conduct any specialist study. It is believed that this objective has been achieved and adequately documented in this report. All possible environment aspects have been adequately assessed, and necessary control measures have been formulated to meet statutory requirements. These measures have been presented in the Environmental Management Plan for this project and appended to this report.

8.1 Assumptions and Conclusions.

- There are no objections regarding the proposed oxidation ponds site which is located within the gazetted Epukiro Community Forest.
- There are two proposed sewer pipeline routes, of which Alternative 2 is the most preferred as it located far from the existing graveyard.
- The residents are concerned with the proposed sewer pipeline route and the proximity proposed Alternative route 1 to the existing community graveyard. Hence, Alternative 2 is more favourable provided that measures
- This scoping assessment is limited only to current project and current land use and thus any changes or upgrading of the project and its surrounding will trigger changes to this scoping report and the EMP.
- The proposed oxidation system and new sewer pipeline is a move in the right direction by the ORC; thus, it will address the capacity problems which result into overflowing of untreated sewage into the open environment.
- The proposed new oxidation system is deemed appropriate for the Epukiro POS 3 settlement and is expected to solve challenges of *foul smell, mosquitoes, snakes, birds* that are associated with the current Oxidation ponds.

8.2 EAP Recommendations

To the Design team (Engco Consulting Engineers)

- Present the final project design to the community of Epukiro, including the preferred sewer pipeline route on Alternative route 2
- Ensure there is consideration storm water management around the oxidation pond site to prevent contamination of stormwater from overflowing sewage
- Make provision for lining of all ponds with suitable lining materials such as GSE geomembranes to prevent contamination of groundwater

To the proponent (ORC)

- Apply for a Wastewater and Effluent Disposal Exemption Permit in terms of Section 21(5) and 22 (2) of the Water Act, (Act 54 of 1956) and the Water Resource Management Act of 2013.
- Obtain consent (in writing) from the Ovambanderu Traditional Authority for the proposed construction of oxidations ponds within the Epukiro Community Forest.
- Implement various mitigation measures as outlined in the EMP, conduct monitoring monthly and submit Annual Environmental Reports to the competent authority during the validity of the ECC (3years).
- Appoint an Environmental Control Officer (ECO) who shall be fully responsible to oversee the implementation of the Environmental Management Plan (EMP).
- Provide environmental training and awareness on the content of the EMP provide a copy to all contractors, sub-contractors, employees, and all parties involved in the management of the oxidation ponds. This should be done by the ECO in consultation with the EAP.
- Ensure regular complacence monitoring of the oxidation ponds and operation and ensure compliance to the conditions of the Wastewater and Effluent Disposal Exemption Permit.

b). To the Authorities (DWA and MEFT/DEA)

- DWA: Issue a Wastewater and Effluent Disposal Exemption Permit for the operation and maintenance of the proposed new oxidation ponds in Epukiro POS 3 to ORC and conduct regular compliance monitoring.
- DEA - EC: Issue the Environmental Clearance Certificate for the **proposed Construction, Operation and Maintenance of the new oxidation ponds and sewer pipe system in Epukiro POS 3** with the necessary conditions as outlined above and, in the EMP.,

9. REFERENCES

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