

Draft Environmental Management Plan (EMP)

Environmental Impact Assessment (EIA) Study for the Proposed Construction and Operation of a Wastewater Treatment Plant (WWTP) and Associated Infrastructures in Omaruru Town, Erongo Region



ECC Application No.:

APP-004531

Proponent:

Municipality of Omaruru



Project Consulting Engineer:

Trinitas Consulting Engineers CC



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LIST OF ABBREVIATIONS

Abbreviation	Meaning
DEAF	Department of Environmental Affairs and Forestry
DWA	Department of Water Affairs
EA	Environmental Assessment
EAP	Environmental Assessment Practitioner
ECC	Environmental Clearance Certificate
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental Management Plan
EMS	Environmental and Management System
GG	Government Gazette
GN	Government Notice
HDPE	High-density polyethylene
HIV/AIDS	Human Immunodeficiency Viruses & Acquired Immune Deficiency Syndrome
I&APs	Interested and Affected Parties
MAWLR	Ministry of Agriculture, Water and Land Reform
MEFT	Ministry of Environment, Forestry and Tourism
m ³ /d and m ³ /h	Cubic meter per day and cubic meter per hour
mg/l	Milligram per liter
OHS	Occupation, Health and Safety
PE _{max}	Maximum population equivalent
PPE	Personal Protective Equipment
Reg	Regulation
S	Section
SABS	South African Bureau of Standards

Abbreviation	Meaning
SANS	South African National Standards
SHE Officer	Safety, Health & Safety Officer
TCE	Trinitas Consulting Engineers CC, the Engineering Consultant
WWTP or WWT Plant	Wastewater Treatment Plant

1 INTRODUCTION

Municipality of Omaruru (hereinafter referred to as the *Municipality* or the *Proponent*) proposes to construct and operate a Wastewater Treatment Plant (*WWT Plant* or *the Plant*) and associated infrastructures in Omaruru Town, Erongo Region. The WWT Plant would be located near the proposed landfill west of the town, approximately 2km west of the existing oxidation ponds north west of the Town as shown in Figure 1-1. The Plant will have overflow ponds (size to be confirmed during the detailed design). Furthermore, some of the oxidation ponds in the Town will be decommissioned, while some will be upgraded for continued operations (by upgrading and lining them first to bring them up to standard) and used as temporal holding ponds before treatment at the WWT Plant. The surface area covered by the proposed Plant and its infrastructure is 2 hectares (Ha), which includes 1 hectare for overflow ponds, future expansion of the Plant and a proposed ground-mounted solar (Photovoltaic (PV)) plant.

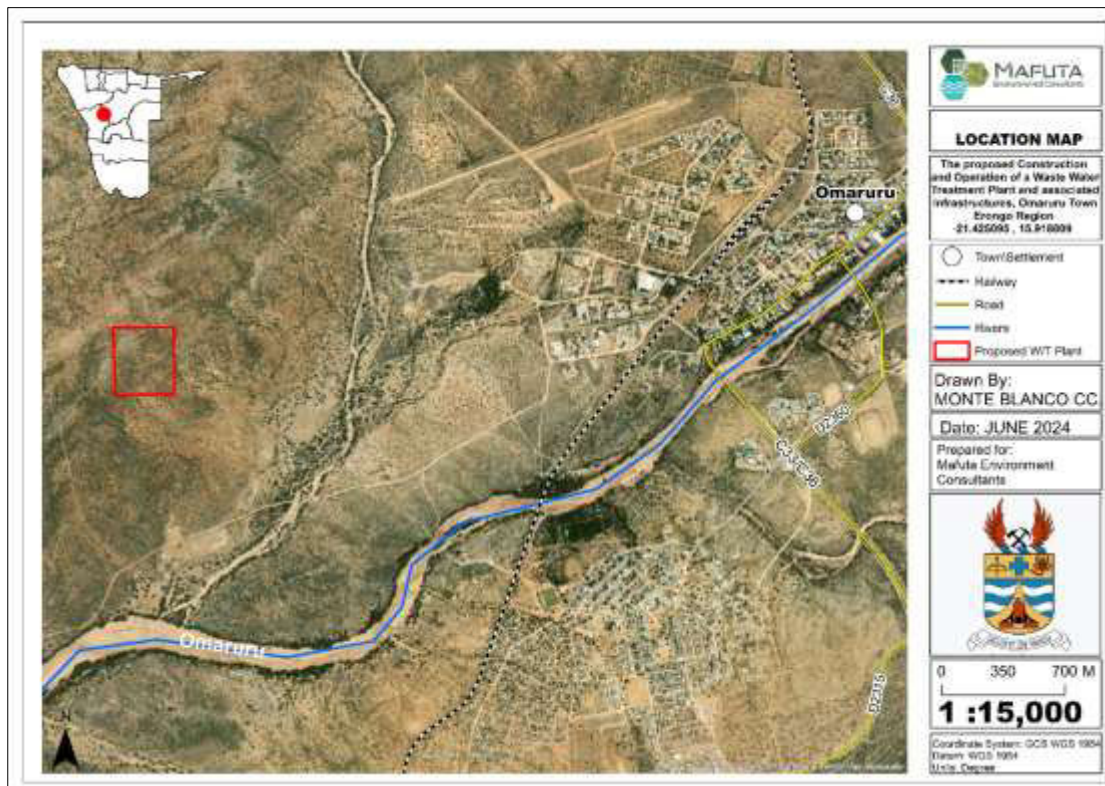


Figure 1-1: Locality map of the proposed construction and operation of a Wastewater Treatment Plant in Omaruru Town, Erongo Region

1.1. Aims of the EMP

Regulation 8 of the Environmental Management Act (EMA) (7 of 2007) Environmental Assessment Regulations (2012) requires that a draft Environmental Management Plan (EMP) be included as part of the Scoping Environmental Assessment (EA) process. A 'management plan' is defined as: "...a plan that describes how activities that may have significant environments effects on the environment are to be mitigated, controlled and monitored."

An EMP is one of the most important outputs of the EA process as it synthesises all of the proposed mitigation and monitoring actions, set to a timeline and with specific assigned responsibilities. It provides a link between the impacts identified in the EIA Process and the required environmental management on the ground during project implementation and operation. It is important to note that an EMP is a legally binding document and a person who contravenes the provisions of this EMP may face imprisonment and/or a fine. This EMP is a living document and should be amended to adapt to address project changes and/or environmental conditions and feedback from compliance monitoring.

The purpose of this document is therefore to guide environmental management throughout the different phases of the proposed project, namely; planning and design, construction, operational and decommissioning phases.

1.2. List of Project Phases Covered in this EMP

The following phases are addressed in this EMP:

- Planning and Design Phase: the period, prior to the construction phase, during which preliminary legislative and administrative arrangements are carried out in preparation of construction activities. The tender process for the construction of the Plant is also included in this phase.
- Construction Phase: the phase during which earth works and site preparation works will be carried out on certain areas of the project site to erect the Plant buildings and for the installation of the necessary services infrastructure and support services required for the WWT Plant operations.
- Operational and maintenance phase: the phase during which the WWT Plant and its related activities will be operated and managed by the Municipality and their appointed Plant Maintenance specialist. It is during this phase that the Town's sewage will be treated, and the treated water be used for different purposed such as irrigation purposes in and around the Town, and possibly other areas in the Erongo Region and the country at large.

- Closure and Decommissioning phase: the closure of the WWT Plant will be when the Municipality (due to unforeseeable circumstances), will decide to cease the Plant's operations, thus, the impact on the socio-economic environment. The guiding points in preparation for the actual and detailed decommissioning plan when the time comes, are provided under chapter 4.

1.3. Environmental Assessment Practitioner (EAP)

Under the Environmental Impact Assessment (EIA) Regulations (2012) of the Environmental Management Act (EMA) No. 7 of 2007, the proposed project is a listed activity that may not be undertaken without an Environmental Clearance Certificate (ECC). The mentioned EMA Sections relevant to the project are as follow:

- *Listed Activity 2.1 the construction of facilities for waste sites, treatment of waste and disposal of waste.*
- *Listed Activity 8.6 the construction of industrial and domestic wastewater treatment plants and related pipeline systems.*

To comply with the EMA and its 2012 EIA Regulations, the Proponent appointed Mafuta Environmental, Consultants CC to undertake the required EIA process, develop this EMP and submit the ECC application to the Environmental Commissioner at the Department of Environmental Affairs & Forestry (DEAF) of the Ministry of Environment, Forestry and Tourism (MEFT). This EMP alongside the EIA Scoping Report will be submitted to MEFT for evaluation and consideration of the ECC.

1.4. Environmental Legal Requirements (Permits and Licenses)

The legal obligations that govern the proposed Plant in terms of required permits / licenses are presented in Table 1-1 below. The detailed legal framework is presented in the environmental report.

Table 1-1: List of applicable legislations for which permitting or licensing will be required for the Plant

Legislation/Policy/ Guideline	Relevant Provisions	Required Permit/Clearance or License and Contact Details
Environmental Management Act EMA (No 7 of 2007)	Requires that projects with significant environmental impacts are subject to an environmental assessment process (Section 27). Details principles which are to guide all EAs.	The EMA and its regulations should inform and guide this EA process.

Legislation/Policy/ Guideline	Relevant Provisions	Required Permit/Clearance or License and Contact Details
Environmental Impact Assessment (EIA) Regulations GN 28-30 (GG 4878)	<p>Details requirements for public consultation within a given environmental assessment process (GN 30 S21).</p> <p>Details the requirements for what should be included in a Scoping Report (GN 30 S8) and an Assessment Report (GN 30 S15).</p>	<p>Should the ECC be issued to the Proponent, it should be renewed every 3 years, counting from the date of issue. Office of the Environmental Commissioner at the DEAF for procedures to be followed.</p> <p>Mr. Timoteus Mufeti: (Environmental Commissioner)</p> <p>Tel: +264 61 284 2701</p>
Water Resources Management Act (No 11 of 2013) and its 2023 Water Regulations	<p>The act provides for the management, protection, development, use and conservation of water resources; and provides for the regulation and monitoring of water services and to provide for incidental matters. The objects of this Act are to:</p> <p>Ensure that the water resources of Namibia are managed, developed, used, conserved and protected in a manner consistent with, or conducive to, the fundamental principles set out in Section 66 - protection of aquifers, Subsection 1 (d) (iii) provide for preventing the contamination of the aquifer and water pollution control (Section 68). The protection (both quality and quantity/abstraction) of water resources should be a priority throughout the project life cycle.</p>	<p>An effluent/wastewater discharge permit should be applied for from the Department of Water Affairs (Policy and Water Law Administration Division at the Ministry of Agriculture and Land Reform (MAWLR)).</p> <p>Mr Franciskus Witbooi: Deputy Director</p> <p>Tel: +264 61 208 7158</p>
Forestry Act 12 of 2001, Amended Act 13 of 2005	<p>Prohibits the removal of any vegetation within 100 m from a watercourse (Forestry Act S22(1)). The Act prohibits the removal of and transport of various protected plant species.</p>	<p>If the need to remove certain vegetation (big camelthorn trees) within the site footprint, the site footprint, a permit should be obtained from Omaruru MEFT' Forestry Office prior to removal.</p>
Nature Conservation Ordinance No. 4 of 1975 (as amended)	<p>Permits are required for the removal of protected plants species.</p>	<p>Mr. Johnson Ndokosho (Director of Forestry Division)</p> <p>Tel: +264 61 208 7666</p>

Legislation/Policy/ Guideline	Relevant Provisions	Required Permit/Clearance or License and Contact Details
Petroleum Products and Energy Act (No. 13 of 1990) Regulations (2001)	Regulation 3(2)(b) states that “No person shall possess or store any fuel except under authority of a licence or a certificate, excluding a person who possesses or stores such fuel in a quantity of 600 litres or less in any container kept at a place outside a local authority area”. Therefore, <u>a fuel storage Permit should be applied for and obtained from the Ministry of Mines and Energy (MME)</u>	Carlo Mcleod (Ministry of Mines and Energy: Acting Director – Petroleum Affairs Tel.: +264 61 284 8291
National Heritage Act (Act No. 27 of 2004)	Should any objects of heritage significance be identified during the upgrading of the ponds, the work must cease immediately in the affected sites and the necessary steps taken to seek authorisation from the Council.	Ms. Erica Ndalikokule (Head: Heritage Management) – National Heritage Council of Namibia Tel: +264 61 301 903

1.5. Limitations of the EMP

This EMP has been drafted with the acknowledgment of the following limitations:

- This EMP has been drafted based on the scoping-level Environmental Assessment conducted for the proposed WWT Plant in Omaruru. No specialist study was conducted for the Scoping Assessment.
- The mitigation measures recommended in this EMP document are based on the impacts in the environmental Scoping Report that were identified based on the project description, site investigation and public input.
- The document was compiled as per project information presented to the Environmental Consultant by the Proponent and their consulting engineers. It was assumed that all the information and data presented was true and accurate.
- Should the scope of the proposed project change, the impacts will have to be reassessed and mitigation measures provided accordingly.

The following are the project’s roles and responsibilities to be assigned as deemed necessary by the Proponent pertaining to the implementation of this EMP.

2. EMP ROLES AND RESPONSIBILITIES

The Municipality of Omaruru (the Proponent) is ultimately responsible for the implementation of the EMP. Alternatively, the Proponent may delegate this responsibility at any time, as they deem necessary during the project phases. The delegated responsibility for the effective implementation of this EMP will rest on the following key individuals which may be fulfilled by the same person:

2.1. Project Manager

The responsibilities of the Municipality's Project Manager (and or Operations Manager) during the construction phase and operational phase, respectively will be to:

- Implement and ensure compliance with the environmental management and mitigation measures proposed in this document.
- Manage and oversee the implementation of this EMP.
- Prevent non-compliance with the EMP and if necessary, deal with perpetrators.
- Ensure compliance with relevant environmental authorisations and license conditions.
- Implement and maintain an Environmental Management System.
- Identify and appoint appropriately qualified specialists (where necessary) to undertake the work components in a timeous manner and to acceptable standards.
- Ensure all incidents which have an environmental and social impact are recorded and documented.
- Compile 6-monthly reports on the implementation of the EMP, as a requirement for the renewal of the Environmental Clearance Certificate.
- Amend the EMP where necessary
- Manage specialized specialists including consultants who may be required on an ad-hoc basis or in terms of environmental support services and independent compliance monitoring and auditing or maintenance. Therefore, these may be contracted or appointed, as and when required

Alternatively, the Proponent may delegate an Environmental Officer (ECO) from within the Municipality itself or they may appoint an external ECO to ensure EMP compliance throughout the project life cycle.

2.2. Environmental Control Officer (ECO) or Safety, Health & Environmental (SHE) Officer

The Proponent should assign the responsibility of overseeing the implementation of the whole EMP on the ground for the construction and operation and maintenance to a designated member of staff or external qualified and experienced person, referred to in this EMP as the Environmental Control Officer (ECO) or Safety, health & Environmental (SHE) Officer. The ECO will have the following responsibilities:

- Managing the implementation of this EMP and updating and maintaining it when necessary

- Management and monitoring of individuals and/or equipment on-site in terms of compliance with this EMP
- Issuing fines for contravening EMP provisions.
- Management and facilitation of communication between the Engineering Consultant (TCE) and Construction Contractor and Interested and Affected Parties (I&APs) with regard to this EMP.
- Conducting site inspections (recommended frequency is monthly during the construction phase and bi-annually for the operation and maintenance) of all areas with respect to the implementation of this EMP (monitor and audit the implementation of the EMP).
- Advising the Project Manager on the removal of person(s) and/or equipment not complying with the provisions of this EMP.
- Making recommendations to the PR with respect to the issuing of fines for contraventions of the EMP.
- Undertaking an annual review of the EMP and recommending additions and/or changes to this document.

2.3. Engineering Consultant, Contractor and, by implication, all Subcontractors

The Engineering Consultant, and Construction Contractor are ultimately responsible for the implementation of the EMP and the action plan, onsite monitoring and evaluation of the EMP during construction through the following

- Develop a Hazard Identification and Risk Assessment report on the on-set of the project to be approved by the Environmental Consultant.
- Developing a waste and health, safety & environment (HSE) management plans to be approved by the environmental consultant
- Submit a monthly Environmental Performance report to the ECO
- For this project it is envisioned that the function of the ECO will only require part time inputs.
- Ensure the relevant commitments contained in the EMP Action Plans are adhered to
- Compile relevant procedures and method statements for approval by the applicable phase Project Manager prior to initiation of activities
- Ensure relevant staff are trained in procedures
- Maintain records of all relevant environmental documentation
- Any on-site decisions regarding environmental management are ultimately the responsibility of the Construction Contractor with consultation with the Environmental Consultant. Therefore, the Contractor must assign the role of ECO to a competent member of its site supervising team. The Contractor shall assist the ECO where necessary and will have the following responsibilities in terms of the implementation of this EMP:

- Ensuring that the necessary environmental authorisations and permits have been obtained by the Contractor
- Assisting the Contractor in finding environmentally responsible solutions to problems with input from the ECO where necessary
- Ordering the removal of person(s) and/or equipment not complying with the EMP specifications.
- Issuing fines for transgressions of site rules and penalties for contravention of the EMP.

3. ENVIRONMENTAL MANAGEMENT MEASURES

The procedures of non-compliance to the EMP, procedures

3.1. Amendments of the EMP

Any party involved with the project can suggest changes to the EMP via the Engineering Consultant. Such suggestions will be discussed with the Proponent. Approved changes will be drafted into the existing EMP in the form of an appendix or amendments.

3.2. Financing of Environmental Control

Financing of the environmental requirements as outlined in this document, apart from the appointment of further environmental consultants and specialists, is the sole responsibility of the Construction Contractor appointed by Municipality of Omaruru. Therefore, it is accepted that the cost incurred for implementing this EMP by the Construction Contractor would be allocated for in the tender document. Any responsibilities not defined in this document or where any uncertainties arise in this matter will be the responsibility of the Proponent.

3.3. Procedures for EMP Non-compliance

The Construction Contractor/Contractor shall comply with the environmental specifications and requirements on an ongoing basis and any failure on his part to do so will entitle the Project Manager/Engineering Consultant to impose a penalty. This applies to the Environmental Management Plan (EMP). In the event of non-compliance, the following recommended process shall be followed:

- The Project Manager shall consult the environmental consultant and if agreed, issue a notice of non-compliance to the Contractor, stating the nature and magnitude of the contravention. A copy shall be provided to the ECO.

- The Contractor shall act to correct the non-conformance within 24 hours of receipt of the notice, or within a period that may be specified within the notice.
- The Contractor shall provide the Project Manager with a written statement describing the actions to be taken to discontinue the non-conformance, the actions taken to mitigate its effects and the expected results of the actions. A copy shall be provided to the ECO.
- In the case of the Contractor failing to remedy the situation within the predetermined time frame, the Project Manager shall impose a monetary penalty based on the conditions of contract.
- In the case of the Contractor being unable to remedy the situation due to permanent environmental damage already incurred, the Project Manager shall impose a monetary penalty based on the conditions of contract.
- In the case of non-compliance giving rise to physical environmental damage or destruction, the Project Manager shall be entitled to undertake or to cause to be undertaken such remedial works as may be required to make good such damage and to recover from the Contractor the full costs incurred in doing so.
- In the event of a dispute, difference of opinion etc., between any parties regarding or arising out of interpretation of the conditions of the EMP, disagreement regarding the implementation or method of implementation of conditions of the EMP etc., any party shall be entitled to require that the issue be referred to independent specialists for determination.
- The Project Manager shall always have the right to stop work and/or certain activities on site in the case of safety and EMP non-compliance or failure to implement remediation measures.

3.4. Fines and Penalties

The following fines and penalties are in place for transgressions listed below. It will be issued after the set procedure has been duly followed and only in severe cases and after repeated non-compliance. The graveness of the transgression is justified by each specific penalty.

3.4.1. Fines

Fines may be issued per incident at the discretion of the Project Manager. Such fines will be issued in addition to any remedial costs incurred because of noncompliance with the EMP. The Project Manager will inform the Contractor of the contravention and the amount of the fine and will deduct the amount from monies due under the Contract.

Fines for the activities detailed below, will be imposed by the Project Manager on the Contractor and/or their Subcontractors.

Offence	Proposed fee
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Any persons, vehicles, plant, or thing related to the Contractors operations within the designated boundaries of a “no-go” area.	N\$2,000
Any vehicle guilty of reckless driving on and in the vicinity of the site, including excessive speeds.	N\$1,000
Any vehicle being driven and items of plant or materials being parked or stored outside the demarcated boundaries of the site.	N\$2,000
Persons repeatedly walking outside the demarcated boundaries of the site.	N\$1,000
Persistent and un-repaired spilling of hazardous materials and materials causing pollution.	N\$3,000
Persistent littering on site.	N\$500
Individuals repeatedly not making use of the designated toilet facilities.	N\$200
Disposal of waste other than agreed on in the waste management plan.	N\$5,000
Deliberate lighting of illegal fires on site and or surroundings.	N\$2,000

For each subsequent similar offence, the fine may, at the discretion of the Project Manager, be doubled in value.

The Project Manager shall be the judge as to what constitutes a transgression in terms of this document.

3.4.2. Penalties

Where the Contractor inflicts non-repairable damage upon the environment or fails to comply with any of the environmental specifications, he shall be liable to pay a penalty fine over and above any other contractual consequence.

The Contractor is **deemed NOT** to have complied with this specification if:

- within the boundaries of the site, site extensions and access roads there is evidence of contravention of the specification; environmental damage due to negligence;
- Safety of contractor personnel and public being compromised due to negligence;
- the Contractor fails to comply with corrective or other instructions issued by the Consulting Engineer (Engineering Consultant) within a specific time;
- the Contractor fails to respond adequately to complaints from the public; and
- Payment of any fines in terms of the contract shall not absolve the offender from being liable from prosecution in terms of any law.

3.5. Key Potential Environmental Impacts to be managed

From the assessment conducted, the following key potential negative impacts have been identified are summarized in Table 3-1 below.

Table 3-1: Summary of key potential environmental impacts per project phase

Positive impacts (benefits)	Adverse (negative impacts)
<p>-Socio-economic development through temporary job (employment) creation in the Town during the construction phase - during the construction phase and few people required for the operational and maintenance.</p> <p>-The WWT Plant will ensure that there is no more loss of usable water through evaporation from ponds. This means the water contained in the wastewater will be recovered through the treatment and used for other purposes in the Town such as irrigation and industrial uses, thus, relieving pressure off the current water supply source (boreholes) for all activities in Omaruru. Therefore, there is an opportunity of recovering resources such as recycled water in the wastewater (e.g., biogas, recycled water).</p> <p>-If effectively implemented in the future, there is an opportunity for biogas recovery from the treatment process of anaerobic. This would be achieved by capturing methane and other gases produced during the treatment of organic waste. The biogas can be used as fuel to generate electricity and heat, often through gas engines or turbines. The gas can supply the WWT Plant itself or provide energy for other uses in the Town.</p> <p>-Improved wastewater management in the Town during the operational phase, thus preventing the amount of wastewater that would otherwise be uncontrollably released into the environment untreated. This would improve the local public and environment health.</p>	<p>-Soil and water pollution: improper handling of wastewater may lead to surrounding soil pollution and water resources systems.</p> <p>-General environmental pollution through mishandling of site waste leads to environmental pollution.</p> <p>-Loss of biodiversity through the removal of vegetation that may be found within the site footprints.</p> <p>-Noise (nuisance): noise generated by machinery and vehicles may lead to nuisance to locals.</p> <p>-Air pollution by potential dust and gas emissions from construction and operational activities.</p> <p>-Odour: Some by-products of anaerobic digestion such as hydrogen sulfide (H₂S) used in wastewater treatment facilities, may give off a strong, nauseating smell. This may affect the nearest locals.</p> <p>-Vehicular traffic: potential increase in local traffic due to construction activities on site and subsequent operational activities.</p> <p>-Occupational and community health and safety: poor work site management, improper handling of site materials and equipment may cause health and safety risks.</p> <p>-Archaeological or cultural heritage impact through uncovering of unknown objects on site (when doing earthworks).</p>

Positive impacts (benefits)	Adverse (negative impacts)
	<p>-Social nuisance and property disturbance by project related workers, especially during the construction phase. The presence of strangers (out-of-area construction contractors) in the area may lead to sexual relations between them and the locals, which may encourage unprotected sex leading to unwanted pregnancies and sexually transmitted diseases. Some constructors may steal or damage and intrude private properties belonging to the locals.</p> <p>-High energy consumption required by the Plant could affect municipal electricity or power supply services, thus, contributing to climate change.</p> <p>-Accidental fire outbreaks from project activities</p>

3.6. Aim of the Environmental Management Actions

The aim of the management actions of the EMP is to avoid potential negative impacts where possible. Where impacts cannot be avoided, measures are provided to reduce the significance of these impacts. Management actions recommended for the potential impacts rated in the EIA carried out for the proposed Plant establishment were based on the four project phases listed below:

- Planning and design (Table 3-2),
- Site establishment and construction (Table 3-3),
- Operation and maintenance (Table 3-4), and
- WWT Plant Closure (impact on the socio-economic environment only) -Table 3-5. The guiding points in preparation for the actual and detailed decommissioning plan when the time comes, are provided under chapter 4.

The responsible persons at the Municipality and/or their contractors should assess these commitments in detail and should acknowledge their commitment to the specific management actions detailed in the phases given under the following subchapters.

3.7. Phase 1: Planning and Design Phase Management and Mitigation Measures

The management requirements detailed in Table 3-2 need to be carried out before any tenders are drafted for the construction of services infrastructure while necessary preliminary legislative and administrative arrangements are made in preparation for the operation of the WWT Plant. These management requirements are also applicable for the period during which engineering designs/drawings are carried out or finalized.

Table 3-2: Management and mitigation measures for the Planning and Design Phase

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe / when?
EMP training	Lack of EMP awareness and the implications thereof	-Employees appointed for construction work on respective infrastructure must ensure that all personnel are aware of necessary health, safety and environmental considerations applicable to their respective work.	-Construction Contractor	Pre-construction
EMP Implementation		-The Project ECO should be appointed to act as an onsite implementing agent. This person should be responsible to ensure that the Proponent's responsibilities are executed in compliance with relevant legislation and this EMP.	-Proponent	Pre-construction
Wastewater Treatment Technology	Machinery and equipment	-All manufactured materials will be required to bear the mark of South African Bureau of Standards (SABS) / South African National Standards (SANS) approval. -Ensure that the Plant machinery and equipment are designed in such a way mechanical failures are minimal to none.	-Proponent -Engineering Consultant, Construction Contractor	Pre-construction
Authorizations	Lack of Permits/ Licenses	-All the required agreements and licenses or permits should be applied for and obtained. The permits, agreements referred to herein include: <ul style="list-style-type: none"> ○ Land acquisition from private landowners where servitudes for the project infrastructure is required (who? the Municipality) ○ Petroleum storage permits (if fuel is stored on site in the volume of 600 litres and more) (who? the Contractor) ○ Waste disposal authorization (who? the Contractor) 	-Proponent -Engineering Consultant, Construction Contractor -Project Manager	Pre-construction

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe / when?
Land acquisition	Loss of land by some landowners to obtain servitudes for pipelines associated with the Plant	<p>-Proper consultation and engagement should be done with the affected landowners and agreement should be reached.</p> <p>-the landowners should be fairly compensated for the loss of their land or portion of it owing to the project infrastructures such as pipelines running across their land.</p>	-Proponent	Pre-construction
Water	Wastewater / Effluent discharge	-An effluent/wastewater permit should be applied for and obtained from the Department Water Affairs and Land Reform (Policy and Water Law Administration Division).	Proponent	Pre-operational phase
	Water pollution control	<p>-Site stormwater management plans (discharge points) should be properly designed to prevent the potentially contaminated run-off from reaching water resources.</p> <p>-To prevent waste discharges from contaminating surface and groundwater, the discharges must be diverted away from surface water and onto turf areas or other appropriate areas.</p> <p>-The site effluent / wastewater and slurry ponds and/or dams should be lined to prevent waste from leaching into the ground, and potentially into groundwater.</p>	<p>-Construction Contractor</p> <p>-ECO</p>	Pre-construction
Vegetation/Flora	Site clearing resulting in loss of vegetation species (protected ones)	-Consult the Forestry Office in Omaruru for site inspection and counting of trees and further advice on permit application and fees to remove trees.	<p>-Construction Contractor</p> <p>-ECO</p>	Pre-removal of the tree(s)

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe / when?
		<p>-Should there be a need to remove certain protected tree species within the site boundary, permit should be applied for and obtained from the Directorate of Forestry Office in Omaruru.</p>		
Labour recruitment	<p>'Outsiders' or out-of area people (businesses) are often given the employment and tender opportunities at the expense of locals who can perform the same work. This may result in conflicts between locals and construction contractors</p>	<p>-Priority for most work to be done during the construction and operational phases should be given to locals, if they have the skills to undertake the work.</p> <p>-Wherever possible, the majority of personnel should be hired locally, thus minimising the need to bring in staff from outside areas.</p> <p>-Employment of out-of-area people should only be considered if the local community does not have the required skills.</p> <p>-Employment should be conducted through the Omaruru Constituency office, as this way, the Constituency councillor can assist the Contractor in obtaining the suitable people for construction.</p> <p>-Recruitment of workers should not be done on site, but only through the Constituency office.</p> <p>-Employment of women, marginalised people and people with disability should be encouraged, where possible.</p>	<p>-Construction Contractor in partnership with the constituency councillor and or existing local development committee (if any) to determine employment considerations.</p>	<p>-Pre-construction (for construction works)</p> <p>-Pre-operational phase (for operations works, if external personnel is required by the Municipality)</p>
Procurement of goods and services		<p>-The procurement stage for the project construction works should follow a fair and transparent process.</p> <p>-Skills transfer and capacity building should be prioritized during construction. This is important that if the construction contract is awarded to an out-of-town company, they should be instructed to team up with a local company to ensure capacity building for locals.</p>	<p>-Proponent</p> <p>-Engineering Consultant</p>	<p>-Pre-construction (for construction works) and as needed during the operational phase (for maintenance)</p>

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe / when?
		<p>-Encourage the provision of goods and services that are locally available should be sourced from the locally available businesses, especially small and medium businesses.</p> <p>-During drafting of tender documents, the consultant shall include provisions designed to maximise the use of local labour. All unskilled labour shall be sourced from Omaruru. Specific recruitment procedures shall be spelled out.</p>		
Construction schedule	Schedule	-A convenient construction work/schedule should be prepared and be shared with the Municipality so that they can inform the local communities of when to expect the construction works in the area.	-Construction Contractor -Proponent	Pre-construction
Social conflicts	<p>-Nuisances caused by the Contractor</p> <p>-Lack of communication between contractor and community</p>	<p>-A meeting should be arranged with the local community once the contractor has been appointed.</p> <p>-The contractor shall appoint an ECO from the construction team to take responsibility for the implementation of all provisions of this EMP</p>	<p>-Proponent</p> <p>-Appointed Construction Contractor and their subcontractor(s)</p>	Pre-construction

3.8. Phase 2: Construction Phase Management and Mitigation Measures

The management requirements detailed in Table 3-3 below will be implemented for the construction phase, as per the timeframe provided thereto.

Table 3-3: Management and mitigation measures for the Construction Phase

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe (When?)
EMP training	Lack of EMP awareness & implications thereof	-Employees appointed for construction works on respective areas of the site must ensure that all personnel are aware of necessary health, safety and environmental considerations applicable to their respective works.	Proponent: ECO / Safety, Health & Environment (SHE) Officer	Throughout this phase
Influx of out-of-area (town) people and businesses to Omaruru	-Improper handling of the recruitment Process by the Construction Contractor and subcontractors	<p>-Wherever possible, the majority of staff should be hired locally, thus minimising the need to bring in staff from outside areas.</p> <p>-Develop an over-arching Environmental and Management System (EMS) where its commitments to fair social and labour practices is stated.</p> <p>-The Contractor and any sub-contractors should be held to abide by the EMS and the Municipality Human Resources and Labour policy. These requirements should be included as part of the tender documentation, to safeguard working conditions and terms of employment for local people.</p> <p>-Support local businesses for construction works, by fostering a supportive environment for local businesses to thrive. This includes buying and procuring locally available goods and services. It helps maintain the Town's unique character and prevents the dominance of large corporations mainly from outside the Town.</p> <p>-Prohibit child and forced labour in the project construction, and in the operations of its service providers.</p> <p>-Training should be provided for every employee as necessary depending on their duties and responsibilities. First aiders and fire wardens should be appointed and trained appropriately.</p>	<p>-Construction Contractor</p> <p>-Project Manager</p>	Pre-construction and throughout this phase (as required)

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe (When?)
		<p>-Promote social integration: Facilitate social integration and cohesion among residents from diverse backgrounds through community events, cultural exchanges, and programs that promote cross-cultural understanding.</p>		
Monitoring	EMP non-compliance	<p>-The implementation of this EMP should be monitored.</p> <p>-The ECO should inspect the site operation throughout the construction period on a weekly basis (4 times a month) and reports compiled monthly.</p> <p>-An EMP non-compliance penalty system should be implemented on site.</p>	-ECO / SHE Officer	Throughout this phase
Conflict	<p>-Communities dissatisfied with the activities</p> <p>-Nuisances caused by the building contractor</p>	<p>-Clear communication between Contractor, Municipality and community on the schedule/timeframe for operations and the duration of the construction phase. This should be provided for in the form of a Public Consultation Plan (PCP) which should include at least:</p> <p>-A system for the on-going management of the communication between the Contractor and local community and Municipal, which should include:</p> <p>*A means for lodging a complaint concerning construction activity</p> <p>*Provision of feedback to the complainant from the Contractor stating how the issue is being addressed</p> <p>*Report back on issues raised and how addressed from the Contractor to the Project Manager and Municipality</p> <p>-Present detailed construction programme during a meeting with the local community (representatives) and Municipality.</p>	<p>-Construction Contractor</p> <p>-Project Manager</p>	Throughout this phase

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe (When?)
		<p>-Ensure that relevant stakeholders are adequately informed throughout construction and that there is effective communication with and feedback to the Proponent’s Project Manager.</p> <p>-A clear communication procedure/plan which includes a grievance and response mechanism should be compiled.</p> <p>-The Contractor shall appoint a person from the construction team to take responsibility for the implementation of all provisions of this EMP.</p>		
Site Preparation	Site Earmarking and disturbance to areas outside the site boundaries	<p>-Areas of the Plant buildings should be marked out (e.g. on the ground or with danger tape) before any workers, equipment or building materials are brought on site. A 2-metre buffer can be allowed around the perimeter of buildings to allow construction activities.</p> <p>-The marked-out area should be inspected and approved by the Project Manager. Thereafter, all site staff should be clearly informed that they may not move or disturb any areas beyond those limits.</p> <p>-The only land area that may be cleared on site is the roads, the areas where buildings will be erected, parking bays, driveways and pathways.</p> <p>-As far as possible, all lay-down areas, such as the areas where building materials and equipment are stockpiled, should be areas that will later be used for parking, building, or driveways. In other words, materials should not be stockpiled in surrounding areas beyond the actual final camp footprint and 2 metre buffer distance.</p>	<p>-Project Manager</p> <p>-Construction Contractor</p> <p>-ECO / SHE Officer</p>	Pre-construction
Sourcing of materials	Construction materials	<p>-Sand required for construction and other locally-derived building materials should only be procured from sites that are environmentally cleared, i.e. sand mining sites that have been issued with Environmental Clearance Certificates (ECCs).</p>	<p>-Construction Contractor</p> <p>-Project Manager</p>	Pre-construction

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe (When?)
Site access	Compromising site security and public safety	<p>-A temporary construction wall should be erected around the site and an electric fence erected for the operational phase to restrict unauthorized public access to the site.</p> <p>-A 24-hour security service should be placed onsite to guard construction vehicles, equipment and machinery against theft and vandalism. The security service should be upgraded with surveillance systems (CCTV camera) extended to the operational phase.</p>	<p>-Construction Contractor -Project Manager</p>	<p>Pre-construction Security services to be deployed from the day of mobilizing equipment and machinery to site</p>
Biodiversity	Loss of fauna and flora	<p>-Environmental awareness on the importance of biodiversity preservation should be provided to the site contractors and workers.</p> <p>With regards to the vegetation on or within proximity of site, the following mitigation measures should be implemented:</p> <p>-Even if certain vegetation is found within actual site footprint, this does not mean that it should be removed. Therefore, care should be taken when preparing the site without destroying the vegetation.</p> <p>-Vegetation found on the sites, but not on the site infrastructure footprint should not be removed or disturbed in any way, but should be left to preserve biodiversity on the site.</p> <p>-Environmental awareness on the importance of biodiversity preservation should be provided to the workers.</p> <p>-Environmental awareness on biodiversity preservation (both plants and even small animals encountered onsite) should be provided to the workers and contractors during EMP induction.</p>	<p>-Construction Contractor -Project Manager -ECO / SHE Officer</p> <p>Workers involved in this phase</p>	<p>Throughout this phase</p>

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe (When?)
		<p>-No alien vegetation may be introduced to the site in the form of seeds or plants, for beautification or any other reason.</p> <p>-At the end of construction all alien vegetation that has established should be eradicated.</p> <p><u>Measures for livestock, wildlife, reptiles and birds</u></p> <p>-Illegal hunting (poaching) of wildlife and around the site is strictly prohibited. Therefore, cannot be forgiven/pardoned and the offender must handed over to the Police.</p> <p>-The killing, snaring, trapping and stealing of community livestock is strictly prohibited.</p> <p>-Refrain from disturbing or killing small soil and animal species found on and around the site.</p> <p>-Visible breeding sites for birds and animals occurring on and around the sites should not be destroyed nor disturbed.</p> <p>-Refrain from removing or destroying the bird nests on trees.</p> <p>-Construction trenches should be secured and backfilled or levelled upon completion of works to prevent animals from falling into trenches.</p> <p>-The recommended speed of 40km/hr on around the site should be adhered to while looking out for animals and people (especially children).</p> <p>-Incorporate Environmental awareness and biodiversity preservation into the employment contracts of all workers.</p>		

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe (When?)
Soils	<p>Site soils (land) disturbance</p> <p>Soil erosion</p>	<p>-The topsoil stripped from certain site areas to enable construction works and can be returned to its initial position, should be returned. This is to avoid unnecessary stockpiling of site soils which would leave them prone to erosion.</p> <p>-All construction pits excavated on site should be rehabilitated and returned to their pre-excavation state as possible.</p> <p>-Soils that are not within the intended footprints of the site areas should be left undisturbed and soil conservation implemented as far as possible.</p> <p>-Project vehicles/machinery should stick to access roads provide and or meant for the project operations but not to unnecessarily create further tracks on and around the site by driving everywhere resulting in soil compaction.</p> <p>-Soils that are not within the intended and targeted footprints of the site should be left undisturbed and soil conservation implemented as far as possible.</p> <p>-Access roads should be designed appropriately in a manner that disturbs minimal land areas as possible.</p> <p>-Make use of the existing road network as much as possible and avoid off-road driving.</p>	<p>-Construction Contractor</p> <p>-Project Manager</p> <p>-ECO / SHE Officer</p>	<p>Throughout this phase</p>
Soils	Pollution	<p>-Spill control preventative measures should be put in place to manage soil contamination, regardless of the volume of pollution (spill).</p>	<p>-Construction Contractor</p> <p>-Project Manager</p> <p>-ECO / SHE Officer</p>	<p>Throughout this phase</p>

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe (When?)
		<p>-Potential contaminants such as hydrocarbons, and wastewater should be contained on site and disposed of in accordance to municipal wastewater discharge standards so that they do not contaminate surrounding soils.</p> <p>-An emergency plan should be available for both major and minor spills on site in both project phases.</p> <p>-Where hydrocarbons and other chemicals are used during the project's phases on site, impermeable liners should be laid on such sites to capture possible spills, and prevent these substances from reaching the site soils.</p> <p>-Drip trays should be made available for project vehicles, especially heavy trucks to contain possible fuel leaks and spills while parked on site.</p> <p>-In an event that any of the substances mentioned above, spill on the soil, the contaminated soil should be cleaned up immediately and dispose of in a designated hazardous waste bin and transported to the nearest approved landfill site. The contaminated and removed soil should be replaced with clean soil.</p> <p>-Spill control preventive measures should be in place on site to management soil contamination, thus preventing and or minimizing the contamination from reaching groundwater bodies. Some of the soil control preventive measures include the following:</p>		

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe (When?)
		<p>*Identification of oil storage and use locations on site and allocate drip trays and polluted soil removal tools suitable for that specific surface (soil or hard rock cover) on the sites.</p> <p>*Maintain equipment and fuel storage tanks to ensure that they are in good condition thus preventing leaks and spills.</p> <p>*The oil storage and use locations should be visually inspected for container or tank condition and spills.</p> <p>*Maintain a fully provisioned, easily accessed spill kit. Spill kits should be located throughout the active project sites contain the floor dry absorbent material and absorbent booms, pads, mats.</p> <p>*All project employees should be made aware of the impacts of soil pollution and advised to follow appropriate fuel delivery and handling procedures.</p> <p>*The Contractor should develop and prepare countermeasures to contain, clean up, and mitigate the effects of an oil spill. This includes keeping spill response procedures and a well-stocked cache of supplies easily accessible.</p> <p>*Ensure employees receive basic Spill Prevention, Control, and Countermeasure (SPCC) Plan training and mentor new workers as they get hired in each phase of the project.</p>		

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe (When?)
		<p>-The site areas where hydrocarbons will be utilized, the surface should be covered with an impermeable plastic liner (e.g., an HDPE liner), carefully placed to minimize risk of puncturing, to prevent any spillages from getting into direct contact with the soils and prevent eventual infiltration into the ground and pollute groundwater.</p>		
Air Quality	Dust generation	<p>-Ensure that the construction schedule is limited to the given number of days of the week (Monday to Friday), but not every day. This will keep the vehicle-related dust level minimal in the area, especially when it is windy.</p> <p>-In extremely windy days, a reasonable amount of water should be used to suppress the dust that may be emanating from certain site areas (limited to the site only) or certain parts of the local utilized gravel roads generating a lot of dust.</p> <p>-Dust protection masks shall be provided to staff members who are exposed to dust onsite.</p> <p>-Project vehicles and heavy machines should not be left idling when not in use, such that they emit air polluting gases.</p>	<p>-Construction Contractor</p> <p>-Project Manager</p> <p>-ECO / SHE Officer</p>	Throughout this phase

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe (When?)
	Odour	<p>-The first step in solving any odour problem is identifying the source. Since this could be caused by a number of different things, it is best to pinpoint the source of odours with the help of a professional/specialist in wastewater treatment.</p> <p>-The Proponent should ensure that the Plant machinery and equipment are designed in such a way or contain technologies that can help to control or minimize odour.</p> <p>Some further odour controlling measures can be obtained from https://www.pollutionequipmentnews.com/how-to-control-odors-at-wastewater-treatment-plants and these are:</p> <p>-Some options, such as adding chemicals to the water or using deodorizing misting systems, reportedly work well to a certain extent. A sudden change in wastewater composition or weather can cause the odors to intensify. Fine-tuning the wastewater treatment process itself is another odor control tactic, but this can be complex and costly</p> <p>-Covering the problem: Many wastewater treatment plants choose to seal the source of odour (a tank, basin, or lagoon) with an industrial-grade cover, thereby preventing the diffusion of odor vapors. Covering a tank or lagoon to control odors is a rare example of when covering up a problem makes perfect sense.</p>	<p>-Construction Contractor</p> <p>-Engineering Consultant (Planning & Design Engineer)</p>	<p>Pre- Construction</p> <p>During the operational phase, i.e., ongoing,</p>
Water Resources	Pollution	<p>-Potential contaminants such as hydrocarbons (diesel) should be contained on site and disposed of in accordance to the nearest municipal wastewater discharge standards so that they do not contaminate surrounding soils and eventually groundwater.</p>	<p>-Construction Contractor</p> <p>-Project Manager</p> <p>-ECO / SHE officer</p>	<p>Throughout this phase</p>

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe (When?)
		<p>-All run off materials such as hydrocarbons, wastewater and other potential contaminants should be contained on site in designated containers and disposed of in accordance to municipal waste water discharge standards, so that they do not reach to water systems.</p> <p>-Stormwater management plans (discharge points) should be constructed on site to prevent the potentially contaminated run-off from reaching water resources, such as the Omaruru River.</p> <p>-Washing of oily equipment and vehicles onsite is prohibited. This should only be one at a dedicated lined area or at approved washing facilities in Town.</p>	<p>Workers involved in this phases and subsequent phases</p>	
	<p>Water availability (impact on over abstraction of water resources on construction demands)</p>	<p>-Although water is needed for many aspects of construction, it should be used sparingly at all times.</p> <p>-Water reuse/recycling methods should be implemented as far as practicable for the construction works.</p> <p>-All water pipes and tanks must be managed and maintained so that they do not leak and waste water in such manner.</p> <p>-Adhere to licence/permit requirements of the applicable water and wastewater legislation.</p> <p>-The amount of water supplied from the Municipal supply line should be used to inform the abstraction rate and water consumption practices during construction of the proposed Plant.</p>	<p>-Construction Contractor -Project Manager -ECO</p>	<p>Throughout this phase</p>

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe (When?)
		<p>-As per the preceding point, the water management awareness will aid in ensuring that the construction works are not affecting other existing users (the Town community) that rely on the same water supply line. This will also lead to an effective water use and management.</p>		
Health and Safety	General Occupational health and safety	<p>-General health and Safety Inductions including emergency procedures and rescue plans should be provided to all new personnel onsite.</p> <p>-The contractor must adhere to the regulations pertaining to health and safety, including the provision of protective clothing, failing which the contract may be suspended with immediate effect.</p> <p>-Health and Safety Inductions should be provided to all new personnel and visitors onsite.</p> <p>-Failure to remedy such lack of provision may result in the immediate cancellation of the contract according to the clauses stipulated in the Specific and General Conditions of Contract.</p> <p>-The contractor should comply with all relevant labour laws as stipulated by the Labour Act.</p> <p>-Fully furnished first aid kits should be readily available in case of injuries. Training should be provided to 2 or 3 people on administering first aid.</p> <p>-During induction, personnel should be provided with an awareness training of the risks of mishandling equipment and materials on site.</p> <p>-Appropriate and clearly written warning signage should be placed onsite, where visible.</p>	<p>-Construction Contractor</p> <p>-Project Manager</p> <p>-ECO / SHE Officer</p> <p>Workers involved in this phases and subsequent phases</p>	Throughout this phase

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe (When?)
		<p>-A fully furnished first aid kit should be placed at each working site to attend to minor injuries, while major injuries should be attended to at a nearby health centre (clinic and hospitals). 1 or 3 site personnel should be trained on how to administer first aid.</p> <p>-Projected loads should be securely fastened to vehicles to avoid falling off and injuring people.</p> <p>-Heavy vehicle and equipment should be properly secured to prevent any harm or injury to both project personnel and locals.</p> <p>-When working on site, employees should be properly equipped with personal protective equipment (PPE) such as coveralls, masks, gloves, safety boots, earplugs, safety glasses, and hard hats.</p> <p>-Personnel should not be allowed to consume alcohol or other intoxicants prior to and during working hours as this may lead to mishandling of equipment resulting in health and safety risks.</p>		
	Community health and safety	<p>-Construction trenches should be backfilled after completion of road works at sections of the road before proceeding forward.</p> <p>-Ensure that goods and projected loads are securely fastened to vehicles to avoid falling and injure people along the road.</p> <p>-Warning signage should be erected at danger site areas such as open trenches on the road.</p> <p>-Make provision for temporary crossroads at growth centres or where a community vehicle access paths cross over the road so that the community can cross over safely.</p>	<p>-Construction Contractor</p> <p>-Project Manager</p> <p>-ECO / SHE Officer</p>	Throughout this phase

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe (When?)
		<p>-The site areas that are considered temporary risks should be equipped with "danger" or "cautionary" signs clearly written in languages such as Afrikaans and English.</p>		
	<p>Low productivity and increase health risk of workforce due to high temperatures.</p>	<p>-Provide sunhats and ample drinking water to stay hydrated. -Provide regular breaks to workers for their resting and energy recovery. -Where necessary at strenuous jobs, workers should work in shifts.</p>	<p>-Construction Contractor -Project Manager</p>	<p>Throughout this phase and as needed or deem necessary</p>
<p>Dangerous work area</p>	<p>The risk of working at heights</p>	<p>-Provide specialized training for all workers involved in tasks at height, including safe use of equipment, emergency procedures, and fall protection. -Ensure training is updated regularly and whenever new equipment or procedures are introduced. -Verify that workers are competent to perform tasks at height. This includes assessing their understanding of safety procedures and equipment use. -Provide Personal Fall Protection Equipment which entails using appropriate fall protection harnesses and lanyards that are correctly fitted and maintained and employing retractable lifelines or self-retracting devices to reduce fall distance and provide mobility. -Install guardrails around edges, openings, and elevated platforms to prevent falls. -Consider the use of safety nets below work areas where fall protection systems cannot be used.</p>	<p>-Construction Contractor -Project Manager</p>	<p>Throughout this phase</p>

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe (When?)
		<ul style="list-style-type: none"> -Consider and ensure that anchorage points for fall protection systems are secure and able to support the intended loads. -Regularly inspect all equipment and tools used for working at heights, including ladders, scaffolding, and fall protection gear. -Maintain and repair equipment as necessary to ensure it is in good working condition. -Use ladders and scaffolding according to manufacturer guidelines and safety regulations. -Ensure tools and materials are secured to prevent them from falling and causing injury or worse. -Ensure safe access and egress to elevated work areas, such as using stable ladders, stairways, or lifts. -Keep access routes clear of obstructions and hazards. -Monitor weather conditions and avoid working at heights during adverse weather, such as high winds, rain, which can increase the risk of falls. Postpone work until it is safe to commence or resume. -Develop and implement a rescue plan to quickly and safely assist workers who may fall or become stranded at height. -Ensure all workers are familiar with the rescue plan and that rescue equipment is readily available. -First Aid Training (for falls) should be provided to workers, focusing on injuries related to falls and other potential accidents. 		

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe (When?)
		<p>-Training and psychological support can help manage the fear of heights.</p> <p>-Conduct regular safety audits and inspections to ensure compliance with safety measures.</p>		
	Existence of dangerous/hazardous work areas	<p>-The work areas must be set out and isolated and demarcated by means of danger tape daily. The demarcated work area may only contain materials, equipment, and personnel required to execute the work.</p> <p>-Once the work for the day is completed, the demarcated area must be cleaned of any spilled materials and waste products. This must be disposed of in the allocated containers.</p> <p>-If the work area is dangerous or sensitive, the danger tape should stay in place until work is complete or not sensitive anymore.</p>	<p>-Construction Contractor</p> <p>-Project Manager</p>	Throughout this phase
Fire management	Accidental fire outbreaks	<p>-Portable and serviced fire extinguishers should be availed at the onsite and if established, at the campsite.</p> <p>-No open fires should be created onsite.</p> <p>-Make provision for smoking areas for crew members who smoke. This is to ensure that the cigarettes' fire is completely put out to and disposed of in allocated bins onsite.</p> <p>-If a campsite is established onsite, consider using gas or paraffin cooks to prepare food instead of open fires. The cooks/stoves fire should be put out before leaving the camp.</p>	<p>-Construction Contractor</p> <p>-Project Manager</p> <p>-ECO / SHE Officer</p>	Throughout this phase

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe (When?)
		<p>-Personnel and visitors alike must be sensitised about responsible fire protection measures and good housekeeping such as the removal of flammable materials (e.g., rubbish, plastics, papers, clothing, dry vegetation, and hydrocarbon-soaked soil) near hazardous substances' containment and handling areas. In other words, these flammable materials should not be left or thrown near the areas. Regular inspections should be carried out to check for these materials at the site.</p> <p>-Make provision for smoking areas for crew members who smoke. This is to ensure that the cigarettes' fire is completely put out to and disposed of in allocated bins at the smoking area.</p> <p>-Potential flammable areas and structures such as fuel storage tanks should be marked as such with clearly visible signage.</p> <p>-Raise awareness to workers on the impact of careless handling of fires and flammable substances in the fire.</p>		
Noise	Noise from project activities	<p>-Noise from vehicles and equipment on sites should be reduced to acceptable levels.</p> <p>-Excavation and transporting of materials from and to site should be done between 08am and 5pm to minimize noise generated by equipment and movement of heavy vehicles.</p> <p>-When operating excavators and other noise generating machinery onsite, workers should be equipped with personal protective equipment (PPE) such as earplugs to reduce exposure to excessive noise.</p>	<p>-Construction Contractor</p> <p>-ECO / SHE Officer</p>	Throughout this phase

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe (When?)
Vehicular Traffic	-General Traffic safety issue owing to increased traffic and slow-moving vehicles in the area	<p>-Project related goods and services should be delivered to site twice a week to reduce the daily movement of trucks and pressure on local roads.</p> <p>-Drivers of vehicles should be in possession of valid and appropriate driving licenses and adhere to the road safety rules.</p> <p>-No heavy trucks or project related vehicles should be parked outside the project site boundary.</p> <p>-Make provision for safe offloading and loading zones onsite.</p> <p>-Drivers should drive slowly (40km/hour or less) and be on the lookout for other vehicles moving at working sites during construction.</p> <p>-Construction vehicles should have a scheduled time for loading and offloading materials at the site so that they do not interfere with daily traffic in the area whenever.</p> <p>-Site access and on-site parking and manoeuvring should be designed in such ways that they do not interfere with other traffic on site and/or compromise traffic safety.</p> <p>-Ensure that the temporary access and detour roads are well equipped with clear and visible temporary road signs.</p> <p>-Vehicles should be in a road worthy condition and serviced regularly to avoid accidents owing to mechanical faults.</p> <p>-During construction, drivers should only make use of designated temporary access roads provided and as agreed.</p>	<p>-Construction Contractor</p> <p>-Project Manager</p> <p>-ECO / SHE Officer</p>	Throughout this phase

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe (When?)
		<p>-Drivers should not be allowed to operate vehicles while under the influence of alcohol.</p> <p>-The deliveries from and to the site during construction should be done during weekdays and between the hours of 8am and 5pm.</p> <p>-Ensure frequent maintenance of detour roads to ensure safety for roads users during construction.</p>		
Waste	Environmental Pollution	<p>-Dispose of waste in a responsible manner and not to litter.</p> <p>-After each daily works, ensure that there are no wastes left onsite or scattered within site premises.</p> <p>-All domestic and general operational waste produced daily should be contained onsite until such that time it will be transported to designated waste sites.</p> <p>-No waste may be buried or burned on site or anywhere else.</p> <p>-The site should be equipped with separate waste bins for solid and general/domestic waste.</p> <p>-A penalty system for irresponsible disposal of waste onsite and anywhere in the area should be implemented.</p> <p>-No waste should be improperly disposed of on site or in the surroundings, i.e. unapproved waste sites.</p>	<p>-Construction Contractor</p> <p>-Project Manager</p> <p>-ECO / SHE Officer</p> <p>Workers involved in this phase</p>	Throughout this phase

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe (When?)
		<p>-Hazardous waste, including emptied chemical containers used during this phase should be safely stored on site where they cannot be reached and used by the unsuspecting and uniformed locals for personal use. No waste should be improperly disposed of on site or its surroundings, i.e. unapproved waste sites.</p>		
	<p>Sewage generated by site workers</p>	<p>-Provide sufficient toilet facilities for workers while onsite (portable chemical toilet, if possible).</p> <p>-No open defecation is allowed on and around the site. Use provided portable toilets for the workers onsite.</p> <p>-Sewage waste should be stored as per the portable chemical toilets supplied on site and regularly disposed of at the Municipal treatment facility.</p>	<p>-Construction Contractor</p> <p>-ECO / SHE Officer</p>	<p>Throughout this phase</p>
<p>Archaeological</p>	<p>Accidental disturbance of archaeological resources or heritage objects</p>	<p>-Identified of any archaeological significant objects (unknown graves, bones and artefacts) onsite should not be disturbed, but should be reported to the project ECO whole notify the Police and National Heritage Council.</p> <p>-If any archaeological materials or human burials or skeletal remains are uncovered during earthworks, the work in the immediate area should be halted, the finds would need to be reported to the NHC may require inspection by an Archaeologist. The ECO should have the area fenced off and contact NHC (Tel: +264 61 244 375), National Forensic Laboratory (+264 61 240 461) immediately.</p>	<p>-Construction Contractor</p> <p>-Project Manager</p> <p>-ECO / SHE Officer</p>	<p>As and when required/encountered</p>

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe (When?)
		<p>-Avoid direct damaging of archaeological or heritage such that may be encountered during excavations.</p> <p>-All accidental discoveries shall be reported immediately to an archaeologist/heritage practitioner so that an investigation and evaluation of the finds can be made, acting upon advice the HSE Officer will advise the necessary actions to be taken.</p> <p>-The Contractor and their subcontractor(s) should adhere to the provisions of Section 55 of the National Heritage Act in the event significant heritage and cultural features are discovered in the course of project activities.</p>		
Social	Influx of outsiders into the area	<p>-Prioritize the employment of local people, and only if necessary and due to lack of skills in the area, out-of-area people can be given some of the work. This is to avoid the influx of outsiders into the area.</p> <p>-Locals employed during the project phases should be provided with the necessary training of skills required for the project to avoid bringing in many out-of-area employees.</p> <p>-Workers should be engaged in health talks and training about the dangers of engaging in unprotected sexual relations which results in contracting HIV/AIDS and other sexual related infections.</p> <p>-Out-of-area workers that may be employed (due to their unique work skills) onsite should be sensitized on the importance of respecting the local values and norms.</p>	<p>-Construction Contractor</p> <p>-Project Manager</p> <p>-ECO / SHE Officer</p>	Pre-construction and throughout the phase

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe (When?)
	Potential damage or disturbance to private properties and municipal or community properties	<ul style="list-style-type: none"> -The Proponent and its project contractors should inform their workers on the importance of respecting the locals' properties by not intruding or damage their homes, fences or killing their livestock or wildlife. -Any workers or site employees that will be found guilty of intruding peoples 'privately owned properties should be called in for disciplinary hearing and/or dealt with as per their employer's code of employment conduct -Site workers should be advised to respect the community and local's private properties, values and norms. -Unauthorized entry or wandering in private yards or fences is prohibited. -Site workers are not allowed to kill or in any way disturb local livestock and wildlife. -No worker should be allowed to, without permission cut down or damage trees belonging either to the Municipality and private neighbouring properties. 		

3.9. Phase 3: Operational and Maintenance Phase Management Action Plans

The management action plans recommended for operations and site maintenance are presented in Table 3-4 below.

Table 3-4: Management and mitigation measures for the Operation and Maintenance Phase

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe (When?)
EMP training	Lack of EMP awareness and the implications thereof	-Employees appointed for construction works on respective areas of the site must ensure that all personnel are aware of necessary health, safety and environmental considerations applicable to their respective works.	-Project Manager -ECO / SHE Officer	Throughout this phase
Monitoring	EMP non-compliance	-The implementation of this EMP should be monitored. -The site should be inspected bi-annually throughout the operational phase. -Bi-annual environmental monitoring reports should be compiled and submitted to MEFT. -An EMP non-compliance penalty system should be implemented onsite.	-ECO / SHE Officer	Throughout this phase
ECC	Operating with an expired ECC resulting in non-compliance	-A copy of the ECC should be printed and kept onsite for inspection. -The ECC should be renewed every 3 years, at least 1 month before its expiry date. -The bi-annual compliance reports should be used to update the EMP for ECC renewal.	-Project Manager -ECO / SHE Officer	Throughout this phase, and renewal done every 3 years for as long as the Plant is in operation
Authorizations	Lack of Permits/ Licenses	-Treated Wastewater (Effluent) Discharge Permit should be applied for and obtained from the Department Water Affairs and Land Reform (Policy and Water Law Administration Division (who? Proponent))	-Project Manager	Pre-operations
Biodiversity	Loss of fauna and flora	Measures provided under the Construction Phase apply to this phase.	-Project Manager -ECO / SHE Officer Workers involved this phase	Throughout this phase
Soils	Land degradation and Pollution	Measures provided under the Construction Phase apply to this phase.	-Project Manager -ECO / SHE Officer	Throughout this phase

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe (When?)
Sludge management	Improper handling and storage of the sludge	<p>-Consider constant improvement of the treatment processes to reduce the volume of sludge generated. This can be achieved through optimization of chemical dosing and aeration.</p> <p>-Properly treat the sludge to reduce pathogens and odours emanating from it. This can be achieved by aerobic/anaerobic digestion and composting.</p> <p>-Dewater the sludge by using either centrifugation, belt presses or filter presses to reduce the moisture content of sludge, thus, making it easier to handle and transport.</p> <p>-The dried sludge from the wastewater treatment process should be temporarily stored at a designated lined area within the Plant premises.</p> <p>-When ready for transporting to interested consumers (customers), the sludge should be packed in bags and sold as fertilizer in Omaruru and the whole of Namibia, as is it practiced by the Municipality of Swakopmund.</p> <p>-The sludge can be used as a soil conditioner or fertilizer, adhering to regulations pertaining the national acceptable standards of concentration in the sludge before disposal or further use in the environment.</p> <p>-In the case that some of the sludge cannot be beneficially reused, it can be disposed of in a landfill on dedicated lined surface to prevent leachate into the ground and covered to minimize odour issues.</p>	-Project Manager, in collaboration with their external Plant Maintenance specialist, if need be	Throughout this phase
Air Quality	Dust generation	Measures provided under the Construction Phase apply to this phase.	-Project Manager -ECO / SHE Officer	Throughout this phase

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe (When?)
	Odour	<p>-The first step in solving any odour problem is identifying the source. Since this could be caused by a number of different things, it is best to pinpoint the source of odours with the help of a professional/specialist in wastewater treatment.</p> <p>-The Proponent should ensure that the Plant machinery and equipment are designed in such a way or contain technologies that can help to control or minimize odour.</p> <p>Some further odour controlling measures can be obtained from https://www.pollutionequipmentnews.com/how-to-control-odors-at-wastewater-treatment-plants and these are:</p> <p>-Some options, such as adding chemicals to the water or using deodorizing misting systems, reportedly work well to a certain extent. A sudden change in wastewater composition or weather can cause the odours to intensify. Fine-tuning the wastewater treatment process itself is another odour control tactic, but this can be complex and costly</p> <p>-Covering the problem: Many wastewater treatment plants choose to seal the source of odour (a tank, basin, or lagoon) with an industrial-grade cover, thereby preventing the diffusion of odour vapours. Covering a tank or lagoon to control odours is a rare example of when covering up a problem makes perfect sense.</p>	<p>-Project Manager -ECO / SHE Officer</p>	Throughout this phase
Water Resources	Pollution	<p>-Potential contaminants such as hydrocarbons (diesel) should be contained on site and disposed of at an approved hazardous waste (in Windhoek or Walvis Bay) to prevent contamination of surrounding soils and eventually groundwater.</p>	<p>-Project Manager -ECO/ SHE Officer</p>	Throughout this phase

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe (When?)
		<p>-An emergency plan should be available for major / minor hydrocarbon spills and during the transportation of the product(s) to the site.</p> <p>-The wastewater containers or ponds should be lined to prevent dissolving waste from leaching into the ground, and potentially into groundwater.</p> <p>-The transferring of wastewater from holding ponds to the Plant should be properly handled, such that spills are avoided at all cost. This is to ensure that there are no sewage leaks or spills onto the soils and water resources.</p>	Workers involved this phase	
Health and Safety	Occupational and community health and safety	Measures provided under the Construction Phase apply to this phase.	<p>-Project Manager</p> <p>-ECO / SHE Officer</p> <p>Workers involved in this phase</p>	Throughout this phase
Vehicular Traffic	Traffic Safety	<p>Measures provided under the Construction phase applied in this phase, Moreover, the following measures are recommended:</p> <p>-Sufficient parking bays for all project vehicles should be established on site.</p> <p>-Drivers of operational vehicles should be in possession of valid and appropriate driving licenses.</p> <p>-Vehicle drivers should adhere to the road safety rules.</p> <p>-Project vehicles and machinery should be serviced regularly to avoid accidents as a result of mechanical faults of vehicles and machines.</p> <p>-Delivery of goods and services to and from site should be done twice a week to reduce traffic flow from site to and town and vice versa.</p>	<p>-Project Manager</p> <p>-ECO / SHE Officer</p>	Throughout this phase

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe (When?)
Noise	nuisance	-Operational works that generate noise should be limited carried out on between 08h 00 and 17h 00. For the rest of the measures, please refer to management action plans provided under the Construction Phase	Project Manager -ECO / SHE Officer	Throughout this phase
Waste generation	Environmental Pollution	Measures provided under the Construction Phase apply to this phase.	-Project Manager -ECO / SHE Officer	Throughout this phase
Archaeological	Impact on unknown cultural or heritage sites/objects	Measures provided under the Construction Phase apply to this phase	-Project Manager -ECO / SHE Officer	As occurring/encountered
Waste	Environmental pollution	Measures provided under the Construction Phase apply to this phase	-Project Manager -ECO / SHE Officer Workers involved in this phase	Throughout this phase

3.10. Phase 4: Closure of the WWT Plant (Socio-economic only)

The management action plans recommended for closure (decommissioning) in terms of social environment (employment and provision of water recovered from wastewater) are presented in Table 3-5 below.

Table 3-5: Management action plans for the Closure Phase on the social environment

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe (When?)
Employment	Loss of employment	<p>-Inform the employed people onsite of the intentions to close the Plant and the expected date of such closure (at least 6 months in advance). This will provide the employees with enough time to search for work elsewhere (if the Municipality cannot take find alternative work for them within their system) and find alternate employment in the event that they seek to avoid formal retrenchment.</p> <p>-Raise awareness of the possibilities for work in similar or other sectors in the area or Erongo Region.</p>	Proponent: Maintenance Department	Pre-decommissioning
Wastewater treatment	Lack of proper wastewater management and supply of treated water and sludge	-Consider making arrangements well in time for new irrigation water provisions and other uses that relied on the Plant sludge and how to continue with managing the Town' sewage.		Pre-decommissioning

4. GUIDING POINTS TO THE DECOMMISSIONING PLAN

This is the phase during which operations of the WWT Plant will cease. Although not anticipated, some guiding points are provided under this section to provide for when and if that time comes. However, a detailed Decommissioning Plan for the Plant will need to be developed prior to decommissioning and rehabilitation of the site. The decommissioning of the Plant would mean restoring the site by cleaning up the site. This is to ensure that the site is thoroughly cleaned and restored to a condition that is safe for future use or development. This may include landscaping, grading, and removal of any remaining structures or equipment.

The steps under the subheadings below would be followed but not limited to these:

4.1. Detailed Inventory and Assessment

This will entail the creation of a comprehensive inventory of all equipment, structures, and materials, followed by assessing the condition and potential risks associated with each of these items.

4.2. Health and Safety Plan

There will be a need to develop a health and safety plan to protect workers, contractors, and the public. Safety protocols, personal protective equipment (PPE) requirements, and emergency response procedures will be included in this plan (health & safety plan).

4.3. Waste Management Strategy

There will be a need to categorize and manage different types of waste, including hazardous and non-hazardous materials. A plan to handle, store and dispose of waste will be developed accordingly. This will also entail the plan to recycle and reuse of materials from the Plant site, where possible.

4.4. Environmental Protection Measures

The measures to control dust, noise, and emissions during decommissioning activities will be implemented. Furthermore, plans to for soil and water protection to prevent contamination will be developed. This will include erosion control and site stabilization measures.

4.5. Decommissioning Procedures

The procedures for safely decommissioning and removing equipment and machinery (removal) will be outlined, include steps for decontamination, if necessary. This will also entail the methods on demolishing project structures and equipment, i.e., dismantling and demolishing structures as well as the plan to handle and dispose of demolition debris.

The deactivation of systems will also be described steps by steps for safely shutting down and deactivating utility systems, including electrical, water, and chemical systems.

4.6. Implementation

4.6.1. Resource Allocation

Allocation of resources, including personnel, equipment, and materials, for decommissioning activities will be done. A schedule and timeline for each stage of the decommissioning process will be developed.

4.6.2. Contractor Management

The appointment and management of contractors and service providers for specialized tasks, such as hazardous waste removal or demolition will be done. This will be done to ensure that contractors are qualified and comply with health, safety, and environmental regulations.

4.6.3. Execution of Decommissioning Activities

This will require following procedures outlined in the decommissioning plan. Monitoring and supervision of decommissioning activities to ensure compliance with the plan and regulations will be required.

4.6.4. Documentation and Reporting

The detailed records of decommissioning activities, including waste disposal, equipment removal, and environmental monitoring will be maintained. The compiled reports will be prepared for submission to the regulatory authorities (MEFT and MAWLR) as required.

4.7. Site Restoration and Post-Decommissioning

4.7.1. Site Cleanup and Restoration

The site cleanup activities, entailing the removal of any remaining debris and contaminants will be done. This will further include conduct soil and water testing to ensure the site meets environmental standards.

Restoration of the site to its intended future use, which may involve landscaping, grading, or repurposing the area. Thus, ensuring that the site is safe and suitable for its new use or for continued monitoring.

4.7.2. Long-Term Monitoring and Maintenance

A long-term monitoring plan will be developed to check for any residual environmental impacts. Added to that, a maintenance plan will be implemented, if the site will be used for ongoing purposes.

4.7.3. Final Documentation and Closure

A complete and archiving of all final documentation related to the decommissioning process will be required. This will include obtaining final approval or sign-off from regulatory agencies to formally close the decommissioning project.

5. ENVIRONMENTAL MONITORING

Monitoring is the primary way of establishing how well the management system is operating. The extent of monitoring will depend on the size, scale and nature of the facility, the proximity of any developed or urban, and the nature of the local environment (edited after Latto et. al., 2000). In other words, to maintain a low significance rating of potential impacts through implementation of management action plans, it is worthwhile that regular monitoring of the mainly affected environmental components is conducted.

5.1. Environment Management Plan Recommendations

To ensure a healthy and safe environment onsite, a plan for environmental management has to be instituted through monitoring. This involves the collection and analysis of relevant environmental data as well as periodic documentation and reporting.

- External Auditing: The key to a successful EMP is appropriate monitoring and review to ensure effective functioning of the EMP and to identify and implement corrective measures in a timely manner. In the event that discrepancies are identified, the problem must be investigated and attended to. All the results obtained during environmental monitoring must be documented for audit purposes.
- An audit of the environmental management actions undertaken is essential to ensure that it is effective in operation, is meeting specified goals, and performs in accordance with relevant regulations and standards. Audits should be conducted during the operational phase of the facility to ensure adherence to the management measures contained in the EMP.

5.2. Physical Environmental Monitoring

The following components have been identified suitable for monitoring in terms of the Plant's activities during its operational phase:

- Water (both surface and groundwater),
- Dust (and odor during operations)
- Soils, and
- Waste (waste water/effluent, slurry/sludge).

The list of environmental components to be monitored and their details are given in Table 5-1.

Table 5-1: Environmental monitoring program for the construction and operational phases

Component	Parameter	Project Phase	Frequency	Location
Groundwater	Water quality: Ammonium nitrogen, chloride, nitrate-nitrogen, nitrite-nitrogen, potassium, total dissolved phosphorus, pH, electrical conductivity (EC), bicarbonate, calcium, dissolved organic carbon, magnesium, sodium, sulphate, total dissolved solids, an ion balance, and Escherichia coli.	Operational	Quarterly (in April and then October)	Readings should be taken from all nearby boreholes within 2km of the project site. The boreholes to be tested for water quality would be upstream (north of the Plant site) and downstream (south of the Plant).
Surface water	Water quality	Operational	Monthly (during rainy season, i.e., January to March)	In the nearest open water bodies (Omaruru River)
Soil	Phosphorus, nitrate nitrogen (NO ₃ -N), EC, pH and Chloride	Operational	Bi-annually	Next to sewage/wastewater tanks or dams sites, and truck loading and offloading areas
Dust	Fallout	Construction	Weekly	To the east and northeast of site
Effluent / wastewater	pH, electrical conductivity, orthophosphate-P, potassium, sodium adsorption ratio, total nitrogen, total phosphorus, Total Suspended Solids (TSS) and Total Dissolved Solids (TDS)	Operational	Bi-annually (every 6 months)	At the effluent collecting and storing ponds or dams. This will mainly be determined by the effluent discharge permit from the Department of Water Affairs.

5.3. Occupational Health and Safety Monitoring Program

Occupational health and safety monitoring program should include the following:

5.3.1. Surveillance of the working environment:

The Proponent should document compliance using an appropriate combination of portable and stationary sampling and monitoring instruments. Generally, monitoring should be performed during commissioning of facilities or equipment and at the end of the defect and liability period, and otherwise repeated according to the monitoring plan.

5.3.2. Surveillance of workers health

When extraordinary protective measures are required, workers should be provided appropriate and relevant health surveillance prior to first exposure and at regular intervals thereafter. The surveillance should, if deemed necessary, be continued after termination of the employment.

5.3.3. Training

Training activities for employees and visitors should be adequately monitored and documented (curriculum, duration, and participants). Emergency exercises, including fire drills, should be documented adequately. Service providers and contractors should be contractually required to submit adequate training documentation to the Proponent before commencing with their tasks at the site.

5.3.4. Accidents and diseases monitoring

The Proponent (during operational phase), Engineering Consultant and Construction Contractor (during construction) should establish procedures and systems for reporting and recording:

- Occupational accidents and diseases, and
- Dangerous occurrences and incidents.

These systems should enable workers to report immediately to their immediate supervisor any situation they believe presents a serious danger to life or health. The systems and the Proponent should further enable and encourage workers to report to management all:

- Occupational injuries and near misses,
- Suspected cases of occupational disease, and
- Dangerous occurrences and incidents.

All reported occupational accidents, occupational diseases, dangerous occurrences, and incidents together with near misses should be investigated with the assistance of a person knowledgeable/competent in occupational safety. The investigation should:

- Establish what happened, determine the cause of what happened, and
- Identify measures necessary to prevent a recurrence.

5.3.5. Contingency Plan

An emergency is an unplanned event when a project operation loses control, or could lose control of a situation that may result in risks to human health, property, or the environment, either within the facility or in the local community. Emergencies do not normally include safe work practices for frequent upsets or events that are covered by occupational health and safety. The Emergency Preparedness and Response Plan should include the following basic elements:

- Administration (policy, purpose, distribution, definitions, etc.);
- Organization of emergency areas (command centres, assembly points, fire suppression equipment and escape plans),
- Roles and responsibilities,
- Communication systems,
- Emergency response procedures and Emergency resources,
- Training and updating,
- Checklists (role and action list and equipment checklist), and business continuity and Contingency.

6. RECOMMENDATIONS

Mafuta Environmental Consultants recommend that an ECC be issued for the proposed Wastewater Treatment Plant, subject to the following:

- All management and mitigation measures provided in the EMP should be implemented and monitored accordingly.
- The Municipality should strive for continuous improvement and implement new measures (by continuously updating the EMP, as deemed necessary) to ensure effective environmental management, sustainability and protection throughout the project life span.
- All required permits, licenses and approvals for the proposed Plant and associated listed activities should be obtained as required.
- The Proponent, site employees and contractors involved in the project activities comply with the legal requirements governing this type of project and its associated activities.
- All the necessary environmental and social (occupational health and safety) precautions provided should be adhered to.

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

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

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

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

The Site Manager/Supervisor must report the findings to the following competent authorities:

- **National Heritage Council of Namibia: Head Office: +264 61 244 375**
Technical Office +264 61 301 903
- **National Museum (+264 61 276 800)**
- **National Forensic Laboratory (+264 61 240 461)**

Responsibility:

Operator:	To exercise due caution if archaeological remains are found
Foreman:	To secure site and advise management timeously
Superintendent	To determine safe working boundary and request inspection
Archaeologist	To inspect, identify, advise management, and recover remains

Procedure:

Action by person identifying archaeological or heritage material

- a) If operating machinery or equipment stop work
- b) Identify the site with flag tape
- c) Determine GPS position if possible
- d) Report findings to foreman

Action by foreman

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

b) Cease any works in immediate vicinity

Action by superintendent

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

b) Determine and mark exclusion boundary

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

Action by Archaeologist

a) Inspect site and confirm addition to project GIS

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

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

In the event of discovering human remains

a) Actions as above

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

c) Advise and liaise with NHC and Police

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