



**URBAN
DYNAMICS**
town and regional planners

ENVIRONMENTAL MANAGEMENT PLAN:

**FOR THE ALIGNMENT AND CONSTRUCTION OF PUBLIC ROADS
AND THE CONSTRUCTION OF INFRASTRUCTURE AS A RESULT OF
TOWNSHIP ESTABLISHMENT AT OPUWO**

DEVELOPMENT ROLE PLAYERS:

OPUWO TOWN COUNCIL

P O Box 294

OPUWO

NAMIBIA



DEVELOPMENT WORKSHOP NAMIBIA

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SCOPING REPORT FOR THE ESTABLISHMENTS OF TOWNSHIPS AT OPUWO, PREPARED BY

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GENERAL LOCATION DESCRIPTION OF THE DEVELOPMENT AREA:

DESCRIPTOR:	LOCATION SPECIFICS:
NATURE OF ACTIVITIES:	The construction of infrastructure through Township Establishments.
REGION:	Kunene Region
LOCAL AUTHORITY:	Opuwo Town Council
FALL WITHIN:	
PORTION B	of the Remainder of the Farm Opuwo Townlands No. 1115
PORTION Y & X	of the Remainder of Farm Opuwo Townlands No. 867
NEAREST TOWNS / CITY:	Opuwo
LAND USE:	Undetermined
STRUCTURES:	Yes
HISTORICAL RESOURCE LISTINGS:	No
CEMETERY:	No
FLOODLINES:	Yes
ENVIRONMENTAL SIGNIFICANT AREA:	<ul style="list-style-type: none"> ❖ Mopani Woodlands; and ❖ Smaller Ephemeral Rivers
LATTITUDE:	-18.048023
LONGITUDE:	13.860819
RELEVANT LISTED ACTIVITIES:	<p>The Environmental Management Act (Act 7 of 2007),</p> <p>Section 8. Water Resource Developments;</p> <p>8.8. Construction and other activities in watercourses within flood lines;</p> <p>8.9. Construction and other activities within a catchment area;</p> <p>Section 10. Infrastructure</p> <p>10.1. The construction of-</p> <p>10.1. (b) public roads;</p> <p>10.2. Route determination of roads and design of associate physical infrastructure where-</p> <p>10.2 (a) public roads.</p>

ABBREVIATION:	DESCRIPTION:
am	ANTE MERIDIEM / BEFORE MIDDAY
Av	AVENUE
BID	BACKGROUND INFORMATION DOCUMENT
EPP	EMERGENCY PREVENTION PLANS
ER	EMPLOYERS REPRESENTATIVE
EA	ENVIRONMENTAL ASSESSMENT
EC	ENVIRONMENTAL COMMISSIONER
ECO	ENVIRONMENTAL CONTROL OFFICER
EMP	ENVIRONMENTAL MANAGEMENT PLAN
etc.	ET CETERA / OTHER SIMILAR THINGS
e.g.	EXEMPLI GRATIA
FC/AC	FIBRE CEMENT/ASBESTOS CEMENT
HIV	HUMAN IMMUNODEFICIENCY VIRUS
i.e.	ID EST. / IN OTHER WORDS
I&APs	INTERESTED AND AFFECTED PARTIES
NHC	NAMIBIAN HEALTH CARE
NAMPAB	NAMIBIAN PLANNING ADVISORY BOARD
pm	POST MERIDIEM / AFTER MIDDAY
SME	SMALL-AND-MEDIUM-SIZED ENTERPRISE
TMP	TRAFFIC MANAGEMENT PLAN
TRRP	TREE REMOVAL AND REPLACEMENT PLAN
TB	TUBERCULOSIS
WMP	WASTE MANAGEMENT PLAN

UNIT SYMBOL:	UNIT DESCRIPTION:
0°	DEGREES CELSIUS
E	EAST
ha	HECTARES
Km	KILOMETRE
m	METER
mm	MILLIMETRE
S	SOUTH
m ²	SQUARE METERS
%	PERCENTAGE

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1 INTRODUCTION

Development Workshop of Namibia (DWN) is a non-profit trust registered in Namibia. It focuses on sustainable urban development and poverty reduction and is part of a worldwide network of Development Workshop organisations. It was founded in the 1970s by three architect students in the UK and has been funded by non-governmental organisations, private citizens, and national and international development organisations.

In Namibia, DWN's activities focus on urban-related research, the provision of low-cost urban land for housing, and the identification and promotion of appropriate low-cost sanitation solutions for low-income residential areas. DWN's programme is officially supported by the Ministry of Urban and Rural Development and implemented through partnerships with local authorities across the country.

Figure 1. The Locality of Opuwo within the Kunene Region



The DWN have had deliberations with the Opuwo Town Council for portions of Opuwo Townlands to assist the Council with providing low-cost housing via a high-density residential township that caters for the low-income residents of Opuwo. The project sites are located north of Extension 8, Opuwo and south-east of Extension 2, Otuzemba.

As a result, the DWN approached Urban Dynamics to

- obtain approval for the subdivision of the Remainder of Farm Opuwo Townlands No. 1115 and the Remainder of Opuwo Townlands No. 876,

- submit a need and desirability application to the Ministry of Urban and Rural Development for the establishment of townships on two of the subdivided land and
- obtain approval for the layouts of the two new Townships.

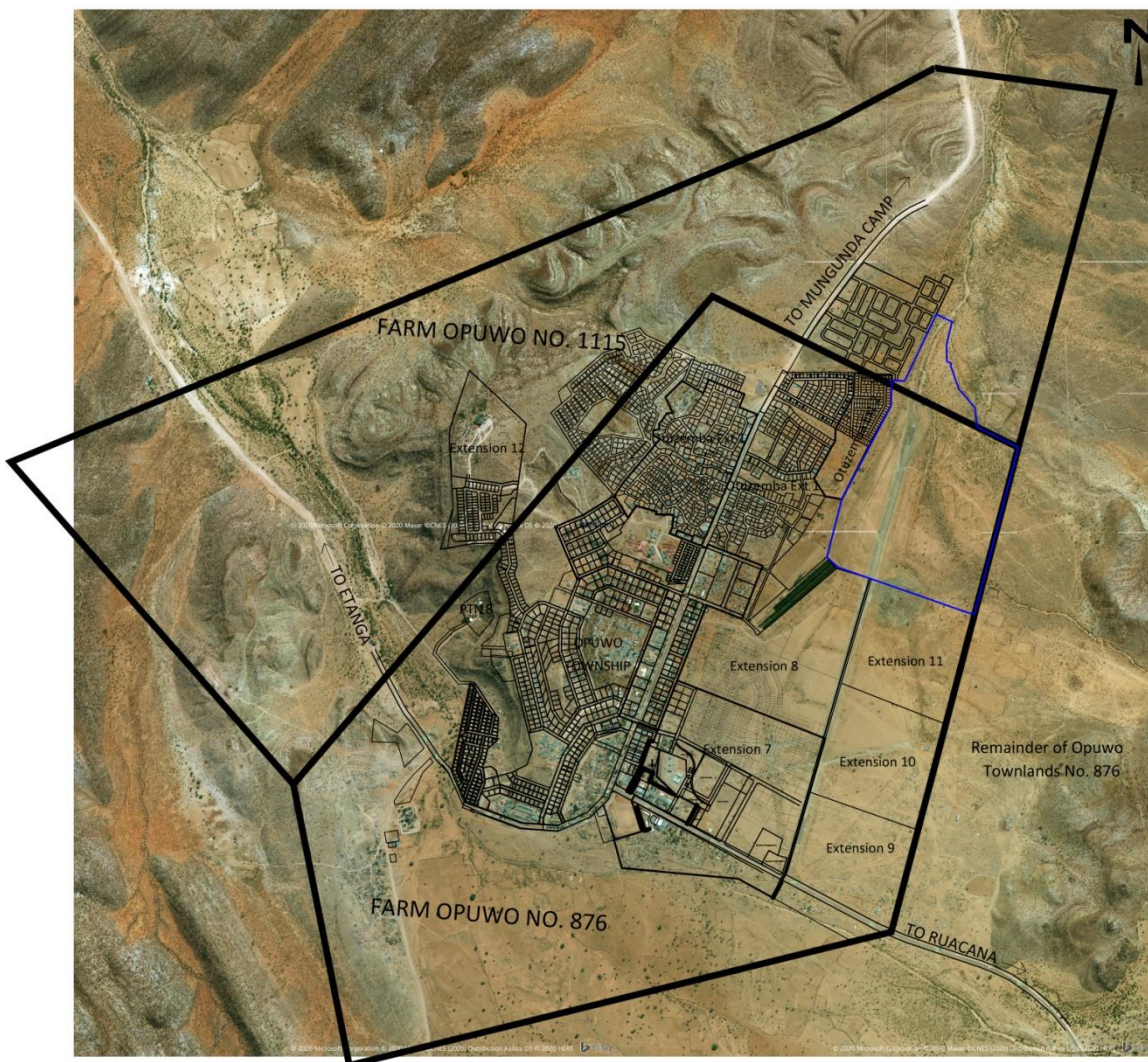
For the purpose of obtaining approval from the Ministry of Urban and Rural Development through the Urban and Regional Planning Board, an Environmental Clearance Certificate must first be obtained from the Ministry of Environment, Forestry and Tourism.

2.1 LOCATION OF THE PROPOSED DEVELOPMENT

Farm Opuwo No. 1115 will be subdivided into Portion A, B and remainder. Simultaneously, the Townlands of Opuwo No. 876 will be subdivided into three new portions, Portions W, X, Y and Z.

The project sites are located at -17.766036 S, 24.693962 E situated Opuwo and south-east of Extension 2, Otuzemba.

Figure 2: Locality of the Portions within the Opuwo Townlands



The layouts will alter the current zoning from undetermined to include Residential-, Institutional-, Business plots and Public Open Spaces. The block's shapes and sizes are illustrated in **Figure 3**.

The tables below provide a summary of the detailed land-use allocation on the Portions, while the mitigated detail of the layout is discussed afterwards.

LEGEND:

- RESIDENTIAL
- GENERAL RESIDENTIAL
- BUSINESS
- INSTITUTIONAL
- CIVIC
- PUBLIC OPEN SPACE

Portion B (to be known as PTN 4/1115 and later as Proper)

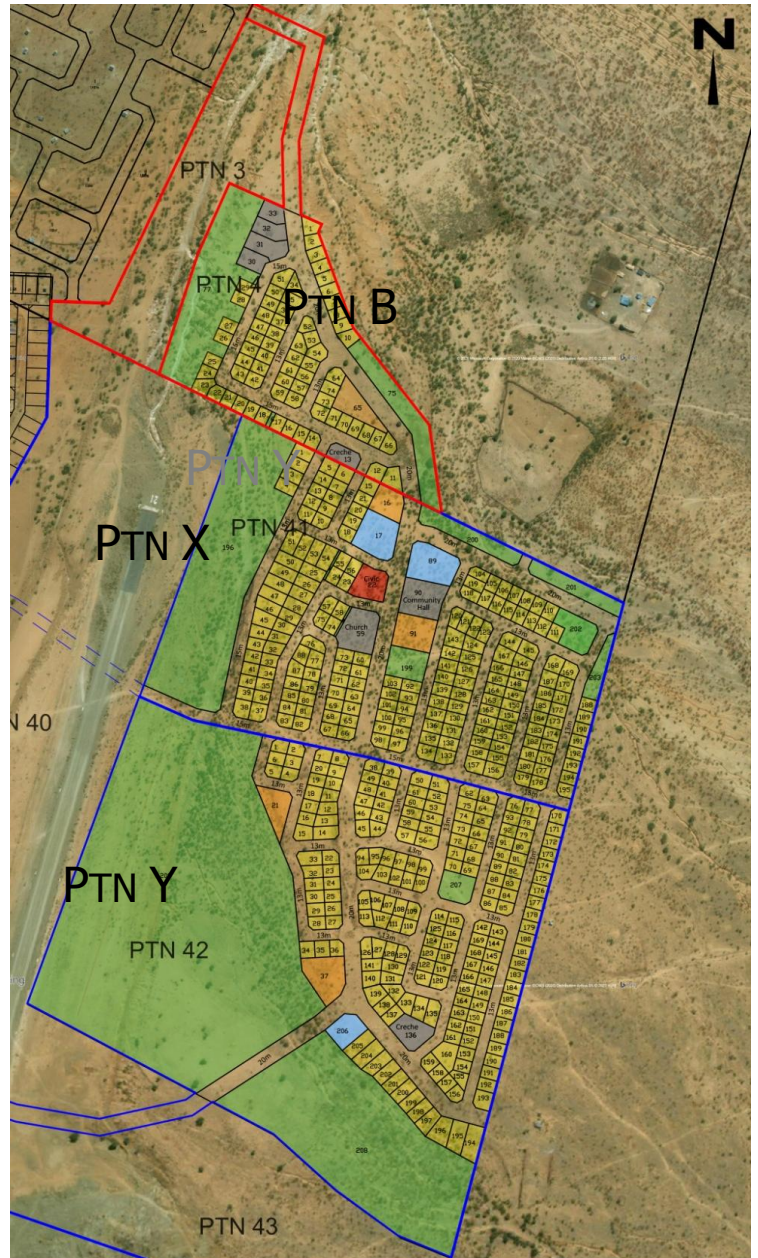
LAND USE	NO. OF ERVEN	TOTAL AREA (m ²)	PERCENTAGE (%)
Residential	68	22078.8	32.3
General residential	1	1650.2	2.4
Institutional	5	4024.03	5.9
Public Open Space	3	17820.1	26.1
Street	-	22 723.8	33.3
Total	77	68 297	100

Portion Y (to be known as PTN 41/867 and later as Extension 1)

LAND USE	NO. OF ERVEN	TOTAL AREA (m ²)	PERCENTAGE (%)
Residential	188	64404	40.5
General residential	2	3131.9	2
Business	2	4644.2	2.9
Civic	1	1446.4	0.9
Institutional	2	4253.8	2.7
Public Open Space	8	37243.2	23
Street	-	43961.5	28
Total	203	15 9085	100

Portion X (to be known as PTN 42/876 and later as Extension 2)

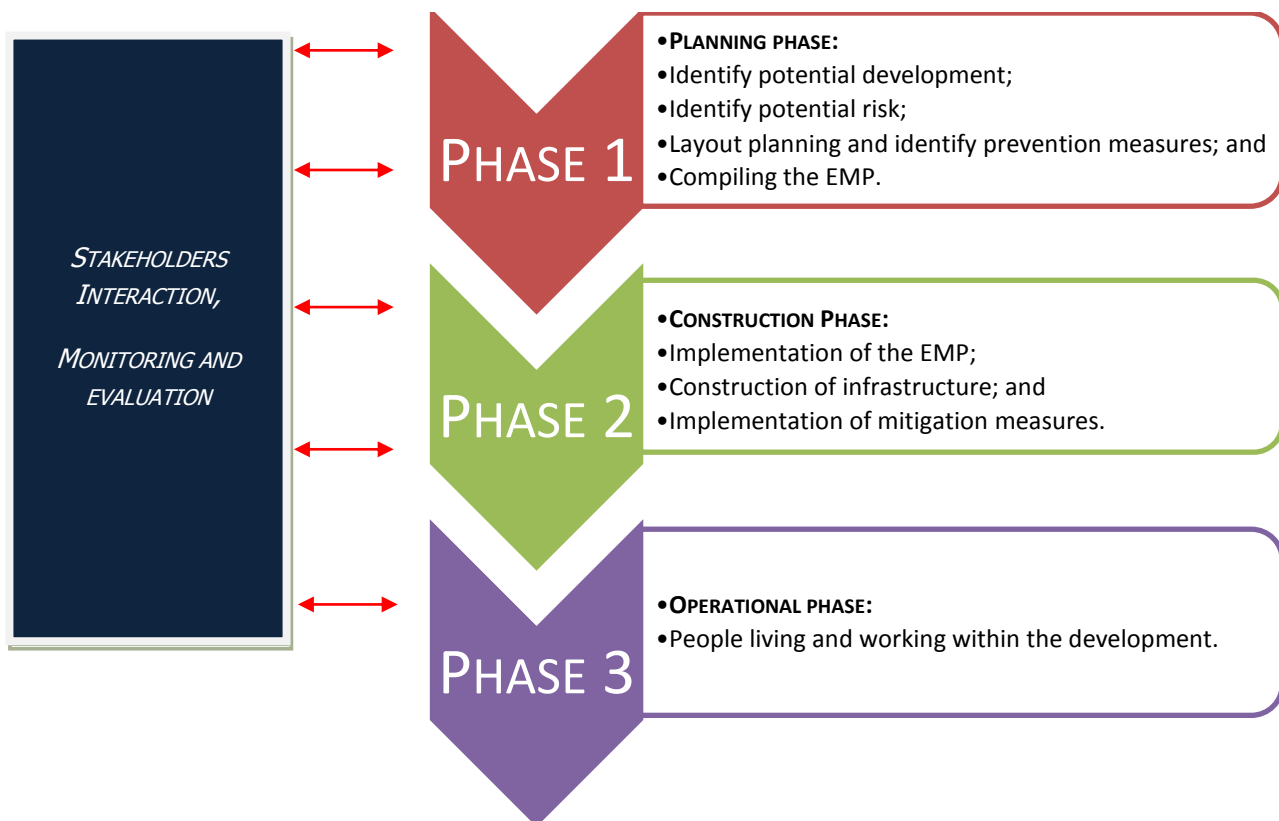
LAND USE	NO. OF ERVEN	TOTAL AREA (m ²)	PERCENTAGE (%)
Residential	202	69 252.5	26.5
General residential	2	3 630.2	1.4
Business	1	1 240.6	0.5
Institutional	1	1 409.2	0.5
Public Open Space	3	139 567.9	53.3
Street	-	46 656.6	18
Total	209	261 757	100



An EMP is an essential product of an Environmental Assessment (EA) process. An EMP synthesises all recommended mitigation and monitoring measures laid out according to the various stages of a project life cycle, with clearly defined follow-up actions and responsibility assigned to specific actors. This EMP has been drafted in accordance with the Namibian Environmental Management Act (No. 7 of 2007) and its Environmental Impact Assessment Regulations (2012). This plan describes the mitigation and monitoring measures to be implemented during the following phases of the development:

- ❖ Construction and
- ❖ Operation

Table 1: Project Phases



2 RESPONSIBILITIES

Implementation of the EMP is ultimately the responsibility of the Opwuo Town Council, who will be the Developer and the administrator of the development after construction. Due to the magnitude of the project, it may be necessary to outsource certain functions pertaining to managing all aspects of the actual development process. When implementing the Environmental Management Plan (EMP), the following roles and responsibilities apply.

Each role player's responsibilities are described.

EMPLOYERS REPRESENTATIVE (ER)

The Employers Representative (ER) is appointed by the Developer to manage all contracts for work/services that are outsourced during the construction phase. Any competent employee or third party organisation which possesses the appropriate experience may fill this position. Any official communication regarding work agreements is delivered through this person/organisation.

The ER shall assist the Environmental Control Officer (ECO) where necessary and will have the following responsibilities regarding the implementation of this Environmental Management Plan:

- ❖ Ensuring that the necessary legal 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 appropriate,
- ❖ Warning and ordering the removal of individuals and/or equipment not complying with the EMP,
- ❖ Issuing fines for the transgression of site rules and penalties for contravention of the EMP, and
- ❖ Providing input into the ECO's ongoing internal review of the EMP. This review report should be submitted on a monthly basis to the Developer.

ENVIRONMENTAL CONTROL OFFICER (ECO)

The ECO should be a competent person appointed by the ER. If the ECO has no training in occupational safety and health on a construction site, they should be sent for such training. The ECO is the ER's onsite representative primarily responsible for the monitoring and review of onsite environmental management and implementation of the EMP by the Contractor(s). If no ECO is appointed the duties of the ECO fall upon the ER. The the Opwuo Town Council should, with the commencement of the project monitor the implementation of the EMP onsite on an ad hoc basis.

The ECO's duties include the following:

- ❖ Assisting the ER in ensuring that the necessary legal authorisations have been obtained;
- ❖ Maintaining open and direct lines of communication between the ER, Developer, Contractor, and Interested and Affected Parties (I&APs) with regard to this EMP and matters incidental thereto;
- ❖ Monthly site inspection of all construction areas with regard to compliance with this EMP;
- ❖ Monitor and verify adherence to the EMP (audit the implementation of the EMP) and verify that environmental impacts are kept to a minimum;

- ❖ Taking appropriate action if the specifications for the EMP are not adhered to;
- ❖ Assisting the Contractor in finding environmentally responsible solutions to problems;
- ❖ Training of all construction personnel with regard to the construction and operation mitigation measures of this EMP and continually promoting awareness of these;
- ❖ Ensure that all contractors shall provide for adequate environmental awareness training (see Plan Component 5) of senior site personnel by the ECO and that all construction workers and newcomers receive an induction presentation on the importance and implications of this EMP. The presentation shall be conducted, as far as is possible, in the employees' language of choice;
- ❖ Monthly inspection to verify if new personnel have received appropriate environmental, health and safety training and training those who have not;
- ❖ Advising on the removal of person(s) and/or equipment not complying with the specifications of the EMP in consultation with the ER;
- ❖ Recommending the issuing of fines for transgressions of site rules and penalties for contraventions of the EMP; and
- ❖ Undertaking a monthly-month review of the EMP and recommending additions and/or changes to the document.

CONTRACTOR

The Contractor is responsible for the implementation, onsite monitoring and evaluation of the EMP. In order to ensure sound environmental management, the relevant sections of this EMP should be incorporated operation in all contracts of work outsourced, thus legally binding all appointed contractors.

The Contractor must keep records of all environmental training sessions, including names, dates and the information presented for inspection and reporting by the ER and ECO at all times.

3 RELEVANT LEGISLATION AND PERMIT REQUIREMENTS

The following table provides the legislative framework within which the EMP should be viewed:

STATUTE	PROVISIONS	PROJECT IMPLICATIONS
<p>THE CONSTITUTION OF THE REPUBLIC OF NAMIBIA, 1990:</p>	<p>The state shall actively promote and maintain the welfare of the people by adopting, inter-alia, policies aimed at the following:</p> <p>(i) <i>management of ecosystems, essential ecological processes and biological diversity of Namibia and utilisation of living natural resources on a sustainable basis for the benefit of all.</i></p>	<p>Ensure that the ecological integrity of the ecosystems of the area is protected.</p>
<p>ENVIRONMENTAL MANAGEMENT:</p>	<p><i>Environmental Management Act No.7 of 2007:</i></p> <p><i>EIA Regulation (EIAR) GN 57/2007 (GG 3212):</i></p> <p>In terms of Section 10.1(a), 10.1(b), 10.2(a), and 10.2(c) for environmental clearance for the construction of oil, water, gas and petrochemical and other bulk supply pipelines, the construction of public roads and the construction of a road with more than one lane of traffic in both directions.</p> <p>In terms of Section 8.8, 8.10 and 8.11, for construction and other activities in watercourses within flood lines, the reclamation of land from below or above the high-water and the alteration of natural wetlands are listed activities.</p> <p>Prescribes the procedures to be followed for authorisation of the project (i.e. Environmental clearance certificate).</p>	<p>Evaluate if the alignment of the street will impact on the social and natural environment.</p> <p>Determine if the risk of flooding of the erven is at acceptable levels.</p> <p>Determine if proposed limited infill would impact the function of the watercourse or cause flooding elsewhere.</p> <p>Determine how wastewater pipelines in the riverbed should be designed, constructed and maintained to prevent groundwater and other pollution.</p>

<p>WATER AND RESOURCES MANAGEMENT:</p>	<p><i>The Water Act No. 54 of 1956 and Water Resources and Management Act No.27 of 2007 Section 92:</i></p> <p>Section 92 (1), A person may not engage in any construction work or activity that causes or is likely to cause, the natural flow conditions of water in to or from a watercourse to be modified, unless the Minister has granted prior written approval for the work or activity to be carried out.</p> <p>Section 100 (e) consult with the regional Council or local authority in determining the geographic extent of flood plain areas in its region or local authority, as the case may be, and assist any such councils in regulating the development and use of land within floodplain areas</p> <p>Section 100 (f) prescribe measures for control and management of storm and flood risk within local authority areas.</p> <p>Section 101 (b) development on the banks of any wetland or dam; and</p> <p>Section 101 (c) the removal of rocks, sand or gravel or any other material from a watercourse.</p>	<p>Assess the potential risk that the planned activities may have on both the watercourse on the one hand and future occupants of the land on the other.</p>
<p>THE PUBLIC HEALTH AND HEALTH AND SAFETY REGULATIONS:</p>	<p><i>The Public Health Act 36 of 1919 as amended and the Health and Safety Regulations:</i></p> <p>These acts control the existence nuisances such as litter that can cause a threat to the environment and public health.</p>	<p>Prevent activities which can have an impact on the health and safety of the public.</p>

<p>POLLUTION CONTROL AND WASTE MANAGEMENT BILL:</p>	<p><i>Pollution Control and Waste Management Bill:</i></p> <p>This bill aims to promote sustainable development and to prevent and regulate the discharge of pollutants into the environment.</p>	<p>Consider the risk of pollution as a result of the sewer infrastructure in the riverbed.</p>
<p>LABOUR:</p>	<p><i>Labour Act. 11 of 2007:</i></p> <p>This bill aims to protect workers and their environment which they work in.</p>	<p>Ensure the protection of workers' rights and safety in Namibia.</p>
<p>COMPENSATION POLICY:</p>	<p><i>Cabinet Compensation Policy Guidelines for Communal land:</i></p> <p>Providing compensation to individuals regarding the relocation of people, removal of fruit trees or the development of Mahango fields, within communal land.</p>	<p>Assess to what extent the proposed policy complies with the provision of the plan to ensure the rights of individuals within communal land.</p>

PLANNING AND DESIGN PHASE**Table 2: Management Requirements for the Planning and Design Phase**

ASPECT	MANAGEMENT REQUIREMENTS
Natural Building Material	All building material (sand and gravel) must be sourced from a local registered borrow pit only. Road building material, (G4, G5, etc. material) must be sourced in collaboration within Opuwo from approved borrow pits within the townlands. If suitable material can only be sourced from untouched land to create a new borrow pit, then that is legally subject to an EIA as well by the Council.
EMP Implementation	Relevant sections of this EMP should be included in the tender documents for all construction so that tenderers can make provision for implementation of the EMP.
Financial Provisions	<ul style="list-style-type: none"> • Financial provision for the facilitation of an induction programme for senior, temporary construction personnel as well as subcontractors and associated personnel should be included as a cost item within tenders concerning the construction and/or operation and maintenance of the proposed development. • Financial provision for the compilation of a Tree Management Plan should be included as a cost item within construction tender documents.
Recruitment	<ul style="list-style-type: none"> • Provisions designed to maximise the use of local labour should be included within tenders concerning the construction of bulk and reticulation services. • A provision stating that all unskilled labour should be sourced locally should be included in tenders concerning the construction of all services of the development. • Specific recruitment procedures ensuring local firms enjoy preference during tender adjudication should be included in tenders concerning the construction of the development's bulk services. • Provisions promoting gender equality pertaining to recruitment should be included in tenders concerning the construction of the township services. • Women should be given preference for certain jobs (e.g. those jobs that require relatively less physical strength).

4 CONSTRUCTION MITIGATION DETAIL

Table 3 provides a scale overview of all the major environmental management themes pertaining to both generic and site-specific construction mitigation detail. This table serves as a reference for the mitigation detail that follows subsequently for each theme. This is done to simplify the implementation of the construction component of this EMP.

Table 3: Generic and Site-Specific Environmental Management Actions:

THEME:	OBJECTIVE:	MITIGATION DETAIL:	
		GENERIC:	ITE-SPECIFIC:
WASTE MANAGEMENT:	Minimise and avoid all waste pollution associated with construction.	PLAN COMPONENT 1	YES
HEALTH AND SAFETY MANAGEMENT:	Focusing on the wellbeing of the labourers on and the community near the construction.	PLAN COMPONENT 2	YES
NOISE AND DUST MANAGEMENT:	Minimise and avoid all noise and dust associated with construction.	PLAN COMPONENT 3	YES
TRAFFIC MANAGEMENT:	Minimise and avoid traffic impacts.	PLAN COMPONENT 4	YES
ENVIRONMENTAL TRAINING AND AWARENESS:	Awareness creation regarding the provisions of the EMP as well as the importance of safeguarding environmental resources.	PLAN COMPONENT 5	YES
ENVIRONMENTAL CONSERVATION:	Minimise the effect of the activity and protect the social environment in which it is happening.	PLAN COMPONENT 6	YES
EMPLOYMENT /RECRUITMENT	Ensure the protection of workers' rights and safety in Namibia.	PLAN COMPONENT 7	YES
STAKEHOLDER COMMUNICATION:	Provide a platform for stakeholders to raise grievances and receive feedback and hence, minimise conflict.	PLAN COMPONENT 8	YES
SOCIO-ECONOMIC AND MISCELLANEOUS:	Protecting cultural and general wellbeing of the affected.	PLAN COMPONENT 9	YES

4.1 PLAN COMPONENT 1: WASTE MANAGEMENT

At the Opuwo construction site, high importance shall be placed on waste management, and it needs to be performed daily. Solid waste is the expected significant source of waste at the construction site, and therefore, a **Waste Management Plan** (WMP) should be compiled. The WMP must address measures for the uses and the disposal of general waste and hazardous waste at the site, as indicated below:

4.1.1 CONSTRUCTION WASTE MANAGEMENT:

GENERAL WASTE:

- The construction site should be kept tidy at all times. All general construction waste produced should be cleaned and contained daily,
- No waste may be buried or burned,
- No waste may be dumped in any watercourse in and around the project area,
- A sufficient number of separate waste containers (bins) for hazardous and domestic/general waste must be provided onsite. These should be clearly marked as such, and
- Construction labourers should be sensitised to dispose of waste in a responsible manner and not to litter.

HAZARDOUS WASTE:

- All heavy construction vehicles and large fuel-powered equipment on the site should be provided with a drip tray,
 - If the vehicle used is suspected of having an oil leakage, drip trays are to be transported with vehicles wherever they go on site.
 - Drip trays should be cleaned daily, and spillage handled, stored, and disposed of as hazardous waste.
- Spilled concrete (wet) should be treated as waste and disposed of by the end of each day in the appropriate waste containers,
- Unbound cement (dry) in its raw state and cement infused water from mixers are classified as hazardous waste, due to its high alkalinity content. Treatment would be the same as for hazardous waste and disposal of such should take place in the appropriate labelled hazardous waste containers,

- A hazardous waste spill clean-up kit should be kept onsite, and its stock replenished as needed. The kit will consist of the following items (with the numbers of each item is up to the discretion of the ER):
 - Medium-sized shovels, strong plastic bags, drip trays, dust masks, heavy-duty gloves, and a biodegradable hand wash (degreasing) agent, and
- A storage location must be provided for the use of all hazardous substances (e.g. fuel etc.) or chemicals. The storage area must be of an impermeable surface; this is bonded awaiting use and disposal afterwards.

The duration of the phase is short term (0-5 years) and will end at the start of the operational phase. The responsibility to implement of the EMP, onsite monitoring and evaluation of the EMP / WMP lies with the Contractor, environmental control officer and the ER.

4.1.2 OPERATIONAL WASTE MANAGEMENT:

GENERAL WASTE:

- The development needs to provide efficient waste management infrastructure for household and business, which will include recycling infrastructure,
- The household and business waste needs to be collected by the Opuwo Council or service provider, and
- Sewerage needs to be pumped through a closed system pipeline to the proposed oxidation ponds.

The timeframe of the actions mentioned above are long term, and the responsibility and monitoring lie with the Opuwo Town Council who will be responsible for the maintenance of the sewerage pipelines after construction and the solid waste removal.

4.2 PLAN COMPONENT 2: HEALTH AND SAFETY

The health and safety aspect of the workspace is something that cannot be understated; considering that unexpected severe events can occur at any given moment.

4.2.1 HEALTH AND SAFETY MANAGEMENT:

The construction industry is fraught with hazards; therefore, careful planning and prevention measures are necessary to reduce the risk of serious injuries while on duty.

The Contractor needs to apply to the Labour Act. Nr 11 of 2007 in conjunction with Regulation 156, 'Regulations which describe the health and safety of employees at work'.

HIV/AIDS AND TB TRAINING:

The Contractor should approach the Ministry of Health and Social Services to appoint a health officer to facilitate HIV/AIDS and TB education programmes periodically onsite during the construction phase.

ROAD SAFETY:

- Vehicles contents/consignments should be adequately secured to avoid items falling off the vehicle.
- All trucks carrying sand or fine material loads should be covered with a shade net cover to prevent these materials from being blown off onto approaching vehicles from both directions.
- No construction vehicle may be used to transport personnel to and from the construction site. This is an offence and punishable by law due to the extreme safety risk involved.

SAFETY AROUND EXCAVATED AND WORK AREAS:

- A meeting with the neighbouring community shall be held, and the safety precautions of the construction area explained,
- Excavations should be left open for an absolute minimum time only,
- Excavate short lengths of trenches and box areas for services or foundations in such a way that the trench will not be left unattended for more than 24 hours,
- Demarcate the following areas with danger tape or orange demarcation netting:
 - All excavation works;
 - Soil and other building material stockpiles; and

- Temporary waste stockpiles.
- Provide additional warning signage in areas of movement and in "no person allowed" areas where workers are not active;
- Work areas must be set out and isolated with danger tape on a daily basis,
- All building materials and equipment are to be stored only within set out and demarcated work areas;
- Only construction personnel will be allowed within these demarcated work areas; and
- Two dry chemical powder fire extinguishers should be available at fuel storage areas and the workshop area, as well as the site office.

ABLUTIONS:

- Separate ablutions (toilet) should be available for men and women and should clearly be indicated as such,
- Portable toilets (i.e. easily transportable) should be available at every construction site:
 - 1 toilet for every 25 females.
 - 1 toilet for every 50 males.
- Sewage waste needs to be removed on a regular basis to an approved (council) sewage disposal site. Alternatively, pump it into sealable containers and store it until it can be removed, and
- Workers responsible for cleaning the toilets should be provided with latex gloves and masks.

4.2.2 OPERATIONAL PHASE HEALTH AND SAFETY MANAGEMENT:

The site has low lying areas which are known for flooding during the raining season. Low lying contours were identified, which forms flood areas within the sites. The 1 in 25-year floodline Knight Pièsold recommended for the development is based on a maximum flow depth of 0.03 m.

Flood and stream areas are accommodated within public open space within the layouts. This is to ensure that limited development takes place within the flood area. Flood areas within the road reserve will be filled when constructing the road. However, mitigation measures must be put in place to prevent any flood risk within the layout.

Flood Risk Impact Preventions:

- The development should take into account the river channels and the 1 in 25-year floodline;

- All services (power and sewer lines) need to be placed in the evaluated road reserve, to prevent it from being influenced during raining seasons;
- The sewerage network needs to link up with the nearby sewer line which runs through the area. The system will be incorporated with the nearest extensions sewerage network, which flows to the oxidation ponds located east of the settlement. A closed gravity system needs to be used to prevent any future pollution in the area during raining seasons;
- The residents or Contractor need to inform the Council's sewer or electrical department if they have problems with the sewer or electrical network; and
- Culverts need to be maintained.

The timeframe of the actions mentioned above are continuous, and the responsibility and monitoring lie with the Opuwo Town Council or the owner of the new erven.

4.3 PLAN COMPONENT 3: NOISE AND DUST

Noise and dust can cause stress and health impacts on nearby residents, patients at the clinic, students of the nearby schools and construction workers. Therefore, high priority needs to be placed on mitigation measures to manage noise and dust pollution.

4.3.1 NOISE PREVENTION:

Mitigation measures need to be in place to prevent noise pollution within the area.

- No noisy activities onsite between 17:00 and 07:00;
- Construction activities on Saturday should be between 08:00 and 13:00;
- Sunday and public holidays - no noisy activities onsite; and
- In the event that work is necessary outside the designated working hours, all receptors (residents or businesses within 500 m from the work areas) need to be notified at least two days in advance.

The duration of the actions mentioned above are short term, and the impact ceases after the operational phase starts. The responsibility for monitoring lies with the Contractor, Environmental Control Officer of the development, and the Opuwo Town Council.

4.3.2 DUST PREVENTION:

The movement of construction vehicles on bare soil will cause excessive dust, which will expose nearby residents and workers on the site to dust pollution. Fugitive dust from construction sites can spread crystalline silica, which can impact nearby residents and site workers' health.

Fugitive dust from the construction site can also cause poor visibility for road users using the main road B1. Mitigation measures must be put in place to prevent dust pollution.

The following measures are provided below to minimise dust:

- Provide a suitable screen/panels surrounding the construction site, to reduce the spread of dust from the site;
- Dust palliatives need to be applied to the road surfaces to prevent dust clouds;
- A watering truck with semi-purified water should be used on gravel roads with the most vehicle movement, especially during dry and windy conditions;
- Stockpiles of building material and earth material need to be kept moist, or the surfaces need to be kept stabilised. A nylon mesh cover which reduces dust lift with $\pm 50\%$ can be an alternative option;
- Limit the size of stockpiles of large quantities of soil, topsoil and other fine material;
- Dust protection masks should be issued to all workers exposed to dust on the site; and
- Improve awareness of ambient air quality and consideration regarding wind speed and direction when undertaking dust-generating activities.

The duration of the actions mentioned above are short term, and the impact ceases after the operational phase starts. The responsibility for monitoring lies with the Contractor, Environmental Control Officer of the development, and the Opuwo Town Council.

4.4 PLAN COMPONENT 4: TRAFFIC MANAGEMENT

The construction of the infrastructure will have a disruptive impact on the surrounding traffic. Mitigation measures should be in place to minimise the anticipated disruption of the surrounding traffic during the infrastructure upgrade construction.

4.4.1 TRAFFIC DURING THE CONSTRUCTION PHASE:

The following measures are provided to minimise traffic:

TRAFFIC MITIGATION:

- Develop a **Traffic Plan** to reduce traffic flow interference from construction activities. The plan may include advance public notice of routing, use of public transportation, and satellite parking areas with shuttle service;
- Schedule operations, affecting traffic for off-peak hours. Minimise obstruction of through-traffic lanes. Provide a flag person to guide traffic properly and ensure safety at construction sites;
- Construction vehicles should be restricted during peak hours, between 07:00-08:00 and 17:00-18:30; and
- Appropriate advance road warning signage should be used on the site.

The duration of the actions mentioned above is short term and will end when the operation phase commences. The responsibility for implementation and monitoring lies with the Contractor. However, the road infrastructure will become permanent, and the responsibility for maintaining the streets will rest with the Opuwo Town Council after construction.

4.5 PLAN COMPONENT 5: ENVIRONMENTAL TRAINING AND AWARENESS

All construction workers at the development site are to undergo environmental training and awareness programs. The following aspects should be included:

- Explanation of the importance of complying with the EMP;
- Discussion of the potential environmental impacts of construction activities;
- Employees' roles and responsibilities, including emergency preparedness;
- Explanation of the mitigation measures that must be implemented when particular workgroups carry out their respective activities; and
- Explanation of the specific mitigation measures within this EMP, especially unfamiliar

provisions.

During the training sessions, an attendance register should be completed, including the names, positions designations and signatures of everyone who attended the training and kept on file for auditing purposes. Thereby, all the training sessions prior to it being conducted must be approved by the ECO.

4.6 PLAN COMPONENT 6: ENVIRONMENTAL CONSERVATION

4.6.1 TREE MANAGEMENT PLAN:

The scoping report did not identify large, protected trees. However, trees in the project site will remain intact as far as possible during development. Trees should be accommodated on individual erven, and along the road in such a manner as to allow the positioning and construction of residential buildings and construction of the road without necessitating removal.

A **Tree Management Plan** shall be implemented, which should include the following content at the minimum level:

- All protected trees should be surveyed;
- Permits shall be obtained before the removal of protected trees, by the ECO;
- Protected trees which are removed shall be replaced and used within the landscaping of the development; and
- The forestry officers can also direct the Developer to nearby nurseries where additional trees may be bought.

The duration of the actions mentioned above is long term. The responsibility for the implementation of the **Tree Management Plan** lies with the Developer, Contractor and Council.

4.6.2 MATERIALS CAMP AND LAY-DOWN AREAS:

With the ER's assistance, the Contractor needs to identify a suitable location for the **materials camp and lay-down** areas. The following should be considered in selecting these sites:

- The areas designated for the proposed services infrastructure should be used as far as possible; and
- Sensitive areas should be avoided (e.g. watercourses).

The duration of the actions mentioned above is short term. The responsibility for the implementation of the EMP lies with the Contractor, ER and ECO.

4.7 PLAN COMPONENT 7: EMPLOYMENT/RECRUITMENT

The construction of the development will take place over several years and will employ about up to a thousand (500) workers. It is not clear at this stage which skill sets would be required, nor the extent to which employment opportunities could be created in the project area.

The benefits to the local community from jobs could be dependent on the extent of local recruitment and the measures put in place to ensure preferential local gender-based recruitment where possible.

4.7.1 RECRUITMENT:

The formal recruitment process should be compiled and shall include the following minimum provisions:

- The ER and the Contractor shall design a recruitment process whereby local residents shall be given preference;
- Ensure that all sub-contractors are aware of recommended recruitment procedures and discourage any recruitment of labour outside the agreed-upon process;
- Contractors should give preference in terms of recruitment of sub-contractors and individual labourers to those from the project area and only then look to surrounding towns; and
- Clearly explain to all job-seekers the terms and conditions of their respective employment contract (e.g. period of employment, etc.) – make use of interpreters when required.

4.7.2 LEGISLATION:

The Contractor needs to adhere to the legal provisions in the Labour Act (Labour Act. 11 of 2007), for the recruitment of labour (target percentages for gender balance, optimal use of local labour and SME's, etc.) in the contract.

4.8 PLAN COMPONENT 8: STAKEHOLDER COMMUNICATION

Within the construction phase, the Developer should draft a **Communication Plan**. Thereby the ER in collaboration with the Developer must appoint an ECO to liaise between the Contractor, Stakeholders, Developer, and Consultants. The appointed Contractor shall appoint a person from the construction team to take responsibility for the implementation for all provisions of this EMP.

4.8.1 COMMUNICATION PLAN:

In addition, the plan shall specify:

- How stakeholders, who require ongoing communication for the duration of the construction period, will be identified and recorded and who will manage and update these records,
- How these stakeholders will be consulted on an ongoing basis, and
- How grievances shall be handled – i.e. how concerns can/ will be lodged/ recorded and how feedback will be delivered as well as further steps of arbitration in the event that feedback is deemed unsatisfactory.

4.8.2 GENERAL COMMUNICATION:

- The Contractor shall at every site meeting report on the status of the implementation of all provisions of the EMP,
- The ECO must list the stakeholders of the project and their contact details with whom ongoing communication would be required for the duration of the contract. This list, together with the **Communication Plan**, must be agreed upon and given to the ER before construction commences,
- The Communication Plan, once agreed upon by the Developer, shall be binding,
- All communication with the stakeholders must take place through the ECO,
- A copy of the EMP must be available at the site office and should be accessible to all stakeholders,
- The Contractor should liaise with the Developer regarding all issues related to community consultation and negotiation before construction commences,
- A procedure should be put in place to ensure that concerns raised have been followed-up and addressed, and

- All people on the stakeholder's list should be informed about the availability of the complaints register in writing by the ER prior to the commencement of construction activities.

Table 4: Public Consultation Process

THE PROCESS:	DESCRIPTION OF THE PROCESS:
PLANNING PHASE:	
I&APs IDENTIFICATION:	Key Interested and Affected Parties (I&APs) were identified and included in a list of I&APs (Appendix D.3). The list included the Opuwo Town Council council.
NEWSPAPER NOTICES:	Notices were placed, for two consecutive weeks in two widely circulated newspapers, briefly describing the developments and their locality, inviting the public to register as I&APs (Appendix C.1).
INFORMATION PROVISION:	A Background Information Document (BID) was compiled that contained essential information about the project (Appendix C.2).
MEETINGS:	A Public Meeting was held on the 3rd of December 2020 .
Public Comments Period:	The public comments period was from the 12th of November to the 11th of December 2020 .
THE CONSTRUCTION PHASE:	
COMMUNICATION PLAN:	<ul style="list-style-type: none"> ❖ The Contractor shall at every site meeting report on the status of the implementation of all provisions of the EMP. ❖ The ECO must list the project stakeholders and their contact details with whom ongoing communication would be required for the duration of the contract. Together with the Communication Plan, this list must be agreed upon and given to the ER before construction commences. ❖ The Communication Plan, once agreed upon by the Developer, shall be binding. ❖ All communication with the stakeholders must

take place through the ECO.

- ❖ A copy of the EMP must be available at the site office and should be accessible to all stakeholders.
- ❖ The Contractor should liaise with the Developer regarding all issues related to community consultation and negotiation before construction commences.
- ❖ A procedure should be put in place to ensure that concerns raised have been followed-up and addressed.
- ❖ All people on the stakeholder's list should be informed about the availability of the complaints register in writing by the ER prior to the commencement of construction activities.

4.9 PLAN COMPONENT 9: SOCIO-ECONOMIC AND MISCELLANEOUS

Heritage or Archaeological Sites

In the case where a heritage or archaeological site is uncovered or discovered during the construction phase of the development, a 'chance find' procedure should be applied as follows:

- If operating machinery or equipment to stop work immediately;
- Demarcate the site with danger tape;
- Determine GPS position if possible;
- Report findings to foreman;
- Cease any works in the immediate vicinity;
- Visit the site and determine whether the work can proceed without damage to the findings;
- Determine and demarcate exclusion boundary;
- Inspect site and confirm the exact location.
- Advise the National Heritage Council (NHC) and request written permission to remove findings from the work area; and
- Recovery, packaging and labelling of findings for transfer to National Museum.

Should human remains be found, the following actions will be required:

- Apply the 'chance find' procedure as formerly described;
- Schedule a field inspection with an archaeologist to confirm that the remains are human;
- Advise and liaise with the NHC and Police; and

- Remains will be recovered and removed either to the National Museum or the National Forensic Laboratory.

If it is found that the construction site is on a heritage site or an archaeological site, the Developer will need to apply for a permit from the National Heritage Council in order to carry out works in a protected place as indicated in the National Heritage Act 27 of 2004.